American Cinematographer

A.S.C. MAGAZINE

April 1931

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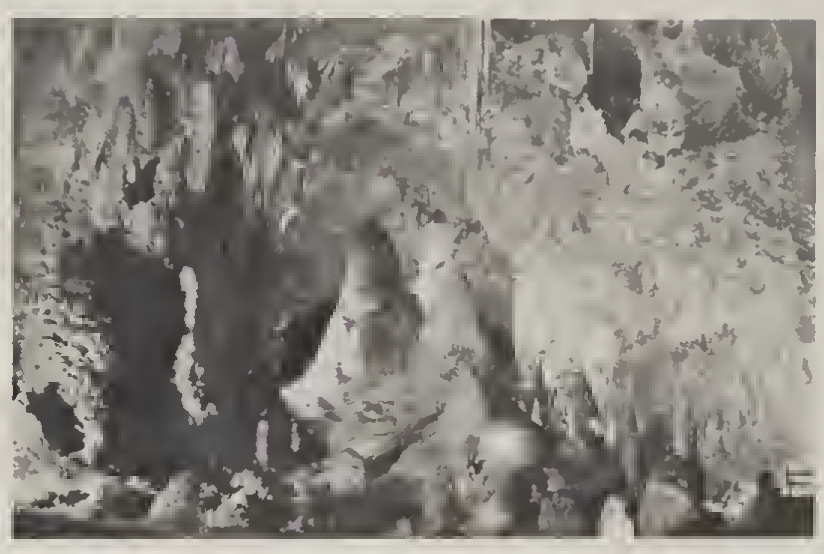


The Big Room of the Carlsbad Caverns. This unusually fine photo was made by Mr. Tappenbeck.

Here we see Mr. Dyer at the camera in the Queen's Room

Photographing the Carlsbad Caverns

With Incandescent Lights and Eastman Super-Sensitive Panchromatic Film

by **ELMER G. DYER, A. S. C.,** and **HATTO TAPPENBECK, A. S. C.**

THE GUADALUPE Mountains in the South-East of New Mexico with their desertlike aspect and growth contain vast subterranean caves, the Carlsbad Caverns

At the height of 4400 feet above sea level the road leads to the natural entrance of the cave, part of which has been exploited for over two decades past for its valuable deposits of bat guano However, the scenic wonders of the Carlsbad Caverns became accessible to the public only in recent years, especially since the National Geographic Society explored them scientifically in 1924

After taking the regular tourist trip in order to ascertain the possibilities of photographing the interior of the caverns and to get our bearings on the feasibility of making an educational subject out of it, we—Elmer G Dyer, A S C, Len Galezio, and Hatto Tappenbeck, A S C—packed our heavy equipment in "packs" down the easy footpaths and broad stairways These are fully lit from the indirect electric floodlights, which are used for illuminating the dripstone formations Perry T Convis, our guide and electrician, who showed an excellent knowledge of the photographic qualities of the cave lead the way down to the 750 foot level, the starting point of our operations

Right here began our difficulties Everything seemed unfamiliar from what we had seen on our first inspection trip Where ever we looked the formations were strangely similar and at the same time vastly different in detail Every angle invited the camera The aspect was indeed bewildering and confusing, such a variety of beautiful formations surrounded us We chose our first set-up Then came the huge task of photographing it

The cave is illuminated in sections through floodlights of 100 to 2000 watts The building and drilling of the new elevator shaft of nearly 800 feet required a considerable amount of the power available For that reason we had to confine our lighting to the natural illumination of the cave formations with an occasional addition of a few 500 watt nitrogen lamps which we carried with us The maximum light we used did not exceed 8000 watts at any time

The use of flares is prohibited Past experiences with them showed that they blackened the formations considerably, and that it took hours and often days before the black smoke cleared away entirely out of the cave That we were compelled to light our subject with incandescents only accounts for the excellent photographic roundness which we obtained, compared with the more or less contrasty and flat results of previous photographic attempts Still photographs have required up to 4 or 5 minutes exposure with the present lighting

You can picture the difficulties we had to overcome with the present rate of camera speed of 24 and the necessity of a character in nearly each scene To express the size of the underground rooms and formations without showing a person for comparison is impossible, and to convey their size truthfully to the condensed space available on the screen has thus far defied all efforts There is no doubt that the accomplished result is of high teaching and educational value but as far as realizing the immensity and the beauty of the Carlsbad Cavern, it seems to be only a feeble attempt It may be best likened to the Grand Canyon which has never been photographed yet to a faith that does it justice

Our camera equipment consisted of a standard Akeley camera with a 230° shutter and motor The fastest lenses made from 35 millimeters up to 12 inches were at our disposal In addition to that we used the fastest commercial film made up to date, the new Eastman supersensitive panchromatic film, which gave us such a splendid recording, that, without exaggeration, we have obtained the best picture ever made of the caverns, considering the small amount of light we used Only to record the extreme close-ups of the formations we used the Eastman Type 2 panchromatic film This proved to be an excellent stock for that purpose and helped considerably to save our limited supply of the supersensitive film for the longer shots

Not knowing the possibilities and limitations of the new supersensitive stock, we resorted to the testbox The first tests we made were very discouraging This was found to be mainly due to the rapid temperature drop of the developer which was especially prepared for this Eastman supersensitive film The temperature inside of the cavern remains constant at 56° F during the entire year, day and night The temperature change of the developer was overcome by heating it in front of the strong incandescents and keeping the testbox itself warm by means of a smaller electric bulb inside of it, when not in use During the night, however, the developer, hypo, water, and everything else dropped again to the constant temperature of the cave

In photographing the different formations of stalactites, stalagmites, coraline encrustations, popcorn and spaghetti-like growths, bunches of grapes, lily pads, etc we encountered such unexpected results in regard to light-value, that a test before every shot was a necessity The time we lost in testing proved to be well spent, since our efforts would have been futile without the tests to judge by The photographic exposure meters which we used so successfully above the ground and on sets did not show any registration due to the great absorption of the light by the porous formation Turning on a few incandescent lights was like striking a match on Broadway The weird and infrequent illumination of the cave defied any accurate guess of distance and therefore light value

We noticed in screening of the film that it is impossible to register depth in the proper way It seemed to fade away in the distance Smaller rooms and small objects recorded much more in their true proportion on the screen This appeared to be due to an optical illusion which in connection with the unusual light effects exaggerated the small objects in the foreground and reduced the far ones, many times as large, to mere miniatures

No two formations in the huge rooms are alike, no two absorb or reflect the light in the same way Occasionally one can detect a bit of color A closer examination under a powerful flashlight reveals on the contrary a wealth of color, chalk white, cream yellow, and a sparkling frost of the stalactites is found near the pink and rose tinted curtains and draperies, while the basic rocks show black, gray, and brick-red in addition to the jade-green of the flowstone, the light cream coloring of the great stalagmite domes, and the turquoise blue of the pools of crystal clear water What a subject for color photography!

The minerals of which these formations are built up, gypsum, lime, and sodium carbonate have their characteristic tints,

The Giant Draperies—photo by Mr Dyer

which may be observed all the way from the entrance down to the lowest levels. Water which once deposited its minerals in the "Auditorium" and formed there the "Speakers Pulpit," etc has seeped 7-800 feet down and does its work over again, creating the same eerie shapes and formations so characteristic of its chemical contents

On the 750 foot level, the only one thus far accessible to the public, are three enormous rooms and numerous smaller ones The "Queen's Chamber," the smallest of the three, 160 feet in length and 140 feet wide, is noted for its "Elephant's Ear," water pools with lily pads, lace draperies, and other fine examples of nature's creative art

Next in size is the "King's Palace," a room of gigantic dimensions with many nooks and niches Thousands of stalactites hang from the ceiling and gleaming onyx folds form transparent curtains of infinite beauty In one corner of the room the stalactites nearly reach the ground closely resembling the pipes of an organ Indeed, a tune may be played on them by tapping the different stalactites, each of which resounds in its own clear and colorful tone, not unlike the chimes of an ancient clock

The "Big Room" is appropriately named It is over ¾ of a mile long Its maximum width is 625 feet, while its ceiling rises up to 300 feet The Capitol in Washington could be placed into it and there would still be space left for other buildings besides! At first the task of lighting and photographing this room so as to do it justice and to show its gigantic dimensions appeared to be impossible Many tests were made, the few lights were changed time and again so as to use them to the best advantage, and the camera was placed to shoot the Big Room to its greatest extent By the end of the day we had the satisfaction of having photographed what might perhaps be called the largest "Interior" with a minimum of light The next day we went into the details of the room The various formations lent themselves to artistic composition and lighting effects from almost every angle Which one of the three or four set-ups to choose was always hard to decide Each one presented such a beautiful picture that it was a standoff to the others.

One of the first shots we made was that of a waterfall, coming out of the ceiling and falling down over several ledges to the bottom of the cave It reminded us of a frozen tree with many branches of ice and snow, which glistened in the light of the incandescents On the screen finally it was a disappointment It turned out to be a neutral gray, which may be explained that certain underlying minerals were seen by the eye, but did not register on the otherwise sensitive emulsion of the film If this formation had been alive still, the result would have been different The greatest art of the Big Room is now inactive That made this location perhaps the hardest we ever worked on in the real sense of the word Most of our camera set ups were off the beaten paths, which had been covered with a clay or dirt like substance out of some pits in the cave This was done to keep the dust down and to make the walking easy for the tourists By the second day our boots showed signs of weakness and on the fifth they were worn through and we walked on our socks To fall down or slip with the camera or other equipment resulted in severe abrasions to clothes and hands on the rasplike formations of lime, gypsum, and sodium carbonate The latter could be found in blocks or powder form all over the cave Our developer called for it, and there was enough of it right here to supply the demand for all the developers in the next hundred years Once on setting the lights and climbing over the uneven ground in the semi-darkness Len Galezio lost his foothold on the loose rock and started sliding towards a large opening in the ground "Keep away from there," the guide called, "that is the Bottomless Pit" Nobody has been able to ascertain its actual depth yet, though one person has been let down in it for 300 feet" On another occasion in order to get a good photographic angle we climbed fifty feet down with the camera in one hand, the other holding onto the wobbly rope ladder, which was left there by a previous expedition

The Twin Domes are undoubtedly the greatest attraction of the Big Room They may be seen from every angle Nearly in the center these giant specimens of stalagmites, light cream and yellow in color, stretch their heads—60-70 feet high

Giant Dome and Draperies—photo by Mr. Tappenbeck

towards the ceiling Their diameter at the base exceeds 16 feet Strangely enough, the little hill which forms their pedestal is of dark gray, nearly black color Imagine the time it took to build these twins up with the slowly dripping water depositing its carbonate of calcium at the rate of one cubic inch per hundred years! The Twin Domes were comparatively easy to light and to photograph as they stand free and are quite accessible On the sides of them huge stalactite draperies hang sixty or more feet down from the ceiling creating the impression as if it all was meant by nature to be a stage setting The remarkable transparency of these pure onyx curtains is easily demonstrated with a few incandescents placed behind them They photographed with surprising fidelity

Imagination plays a great part in these caves The strangely shaped formations convey in many instances the forms of animals to our mind Some of the likenesses are so striking that they have received their names accordingly, such as the 'Baby Hippo,' the "Billing Doves," etc The latter, two stalactites hanging from the ceiling on opposite sides of a smaller passageway, have grown together and resemble closely a pair of doves They are so delicately modeled that they seem to float across the room towards each other

The most exquisite creations of the whole cave are undoubtedly to be found in that part of the Big Room called the 'Crystal Chamber' The formations there are very active Water is constantly dripping from hundreds of stalactites The moisture gives them great transparency of a yellow waxen color This is of high photographic value under the yellow rays of the incandescents, because the sensitiveness of the new panchromatic film has been greatly increased in the yellow band of the spectrum

Not more than 1000 to 2000 watts were required to photograph any part of this room Here we had to make our tests in order not to overexpose Often we switched our section of the cave lights off and thus made a natural dark room out of the cave itself No testbox or changingbag were then required As soon as we stopped moving around the moisture in the air made us chilly Otherwise the coolness of the cave was very pleasing and refreshing However, every night we took our exposed and unexposed film with us out of the cave, to avoid getting it damp and to prevent the dust from the sodium carbonate or lime to seep into the magazines and make chemical stains on the film

Mr Dyer seated among "Lily Pads"

"Elephant's Ear" in Queen's Chamber—photo by Mr Dyer

Graceful draperies, exquisite lace embroidery covered the walls of this masterpiece of nature's handiwork The dripping water collected in turquoise pools of clear drinking water, through which the formations showed so distinctly down to the bottom, as if there had been no water at all We threw little stones in it to register the water in the film, creating the impression of drops falling from the stalactites above Banks of a thin, ice-like crust of minerals stretched partly over the pools Those were strong enough to hold our weight, at the same time transparent as a ground glass to the incandescent lights

Six days we spent transferring these wonders to the film If we had attempted to photograph the entire cave it would have taken us over three months We could go on filming indefinitely and still have found new subjects, new combinations of lighting effects and composition, even if we exposed enough film to make another "Hell's Angels"

Every morning we descended a mile and a half into the earth Every day we made new discoveries We never got tired of looking at the beauty in the cave, in fact, the more we saw of it, the more understanding and appreciation came to us On our daily trip to the surface we noticed in the far end of the "Auditorium" a beautiful sunset with overhanging clouds, painted in gorgeous colors by the light and shadow effect on the rear wall like a back drop of a stage setting

Then climbing towards the cave entrance, still hundreds of feet below the top we got another thrill, seeing the faint blueish-green rays of daylight suddenly burst into a beam of gold with the blue sky and the radiant white clouds above And there among them was Old Glory gracefully waving in the evening breeze

The Depth of Field of Camera Lenses

With Special Reference to Wide Film

by **ARTHUR C. HARDY**
Massachusetts Institute of Technology

BY THE very nature of optical imagery, a lens is capable of forming a sharp image of only a single plane of the object space. In practice, however, such factors as the aberrations of the lens or the graininess of the film establish a limit for the useful sharpness, so there is a certain "depth of field" that may be said to be in sharp focus. The depth of field is sometimes called the depth of focus, but the latter term has a different significance in optical terminology.

The lack of depth of field of a lens is familiar to anyone who has ever attempted to make photographs with lenses of high relative aperture, but there is nevertheless a great deal of misinformation on this subject. This seems to be a consequence of the custom of judging the depth of field from the results of photographic tests, which are seldom conducted in such a manner as to yield results that are really significant. Even if they are, a lens of poor quality has apparently a greater depth of field than a well-corrected one, and the experimental method of determining the depth of field may therefore be very misleading. It is possible to treat this subject theoretically and, as it happens, the rigorous treatment is less complicated than the approximation that is sometimes made.

This subject is particularly timely because of the current discussion concerning wide film. The effect on the depth of field, when photographing a subject on a wider film, is not immediately apparent. Nor is it apparent that the depth of field may be altered by making a large negative and printing by optical reduction on standard film. The purpose of this paper is to consider these questions in some detail, but before this can be done, a certain amount of optical theory must be developed.

Theory

The depth of field of any lens or optical system is given rigorously by the two expressions

$$d_1 = \frac{rP}{mp - r} \tag{1}$$

and

$$d_2 = \frac{rP}{mp + r}, \tag{2}$$

where d_1 represents the depth of field on the far side of the object-plane in sharp focus and d_2 represents the depth of field on the near side. The total depth of field then is

$$d = d_1 + d_2.$$

In the above equations, r represents the radius of the permissible circle of confusion, P is the distance from the entrance-pupil of the lens to the object-plane on which the camera is focused, m is the magnification of an object in this plane on the film, and p is the radius of the entrance-pupil of the lens.

An erroneous estimate of the depth of field of a lens is sometimes made on the basis of the so-called "hyperfocal distance." This is the minimum distance of an object-plane on which the lens can be focused and still have objects at infinity appear sharp. In other words, for this condition, the far depth d_1 is infinite. From equation (1), it follows that this condition will obtain when

$$mp - r = 0. \tag{3}$$

Now, in the Newtonian form of the lens equation,

$$m = \frac{f}{x},$$

where x is the distance of the object-plane in sharp focus from the first focal point of the lens. On substituting for m in equation (3), we have

$$x = \frac{fp}{r}, \tag{4}$$

where x is the hyperfocal distance measured from the first focal point of the lens. Equation (4) can be written in terms of the f/ number of the lens, since this quantity is the ratio of the focal length to the diameter of the entrance-pupil. On substituting, we have

$$x = \frac{f' \ f/\text{number}}{2r} \tag{5}$$

When equation (3) is satisfied, equation (2) shows that the near depth

$$d_2 = \frac{p}{2} \tag{6}$$

Hence, when a lens is focused on the hyperfocal distance given by equation (5), all objects are in sharp focus from infinity to a point half-way between the object-plane in sharp focus and the entrance-pupil of the lens.

Now, a short hyperfocal distance indicates a great depth of field when the camera is focused on the hyperfocal distance. It is sometimes concluded from equation (5), therefore, that the depth of field of a lens varies inversely as the f/ number and inversely as the square of the focal length. This argument takes no account of the fact that the size of the image varies with the focal length, and that a smaller circle of confusion is required for comparable quality in a small picture than in a large one. Furthermore, the lack of depth of field is seldom troublesome when the camera is focused on an object at the hyperfocal distance, but rather when it is focused on a nearby object. Under the latter conditions, the quantity r in the denominator of equations (1) and (2) becomes negligible compared with the quantity mp. Hence equations (1) and (2) become simply

$$d_1 = \frac{rp}{mp} \tag{7}$$

and

$$d_2 = \frac{rp}{mp}, \tag{8}$$

and the total depth of field is

$$d = d_1 + d_2 = \frac{2rp}{mp}. \tag{9}$$

The ratio p/p in the above equation can be transferred to corresponding quantities in the image-space by means of the well known relationship in optical theory that

$$m = -\frac{pp'}{p'p},$$

where p' is the distance of the film from the exit-pupil of the lens and p' is the radius of the exit-pupil. Equation (9) may then be re-written as follows

$$d = d_1 + d_2 = \frac{2rp'}{m'p'} \qquad (10)$$

Now, any comparison of the depth of field of two lenses must be made on a basis that insures the same exposure in both cases, since manifestly any desired depth can be obtained by reducing the lens aperture. It is a well-known fact that the amount of illumination on the film in the image of an extended object is determined by the ratio p'/p'. Assuming a constant value for this ratio, the depth of field is seen from equation (10) to vary directly with the permissible size of the circle of confusion r and inversely as the square of the magnification. This result is independent of the particular form of the lens. In other words, any claim that one lens has a greater depth of field than another is absurd. If experimental tests seem to indicate a difference between lenses, either the two lenses were not used at the same effective aperture and magnification, or the image quality of one is inferior to that of the other and its depth only appears to be greater.

The lack of depth of field is apparent to the motion picture audience when the size of the circle of confusion on the screen exceeds a certain limiting value. Let us designate by R the radius of the largest permissible circle of confusion on the screen. Then

$$R = rm_1m_2,$$

where m_1 is the magnification between the negative and positive in printing (in contact printing this quantity is 1) and m_2 is the magnification of the film on the screen in projection. Substituting for r in equation (10), we have

$$d = \frac{2R}{m m_1 m_2}\,\frac{p'}{p'} \qquad (11)$$

Let us assume now an object or actor of height h in the plane on which the camera is focused. The corresponding height of the image on the screen is

$$H = hmm_1m_2 \qquad (12)$$

Let us designate the over-all magnification between the object and its screen image by M, where

$$M = \frac{H}{h} = mm_1m_2 \qquad (13)$$

With this substitution, equation (11) becomes

$$d = \frac{2R}{mM}\,\frac{p'}{p'} \qquad (14)$$

We see, therefore, that for a fixed value of R and p'/p', the depth of field, as seen by the audience, varies inversely as the original magnification in the camera and the over-all magnification M. In other words, it is just twice as hard to obtain sufficient depth when the actor's head is to be ten feet high on the screen as when it is only five feet high. The advantage of making m small will be dealt with presently.

Application to Practice

Let us consider the case of standard 35 mm. practice where both the negative and positive film are of this width and the printing is done by contact. Equation (14) shows that, for a fixed over-all magnification M, there is a definite gain in making the magnification m, in taking, as small as possible. This implies either using camera lenses of short focal length or placing the camera at a great distance from the actors. For the same over-all magnification M, equation (13) shows that m_2 must be increased in proportion to the decrease in m. In other words, the greatest depth of field is seen to result by making the original negative with as low a magnification as possible and relying on subsequent enlargement to provide the required over-all magnification. The limit to the subsequent enlargement is set by the graininess of the negative material. Unfortunately, this limit has been reached with 35 mm. negative film, as the magnification in the projector is already so high that any further increase makes the graininess decidedly objectionable. We must conclude, therefore, that the depth of field for a given effective lens aperture p'/p is about as great as it can ever be made with 35 mm. film unless the graininess of the film can be reduced enough to permit greater magnification in projection.

Let us now consider the effect of making the original negative and release prints on a wider film. For the sake of convenience, let us assume the film to be 70 mm. in width, or twice as wide as the 35 mm. standard. There are several possible ways of utilizing this increased width, but most producers seem to regard the wider film as an opportunity to include more action on a larger screen, the size of images on the screen remaining approximately as at present. If this plan is followed it is obvious from equation (14) that the depth of field with wide film, at the same over-all magnification M and the same magnification in projection is identical with that obtained in 35 mm. practice. This implies the use of camera and projector lenses of the same focal length as at present. If, on the other hand, larger images are projected on the larger screen, the increased over-all magnification M can be obtained only by increasing either m or m_2. It is impossible to increase m_2 without increasing the appearance of graininess. Hence, any increase in M must be the result of increasing m, and equation (14) shows this procedure will decrease the depth of field. This is not exactly true, because a somewhat larger circle of confusion can be tolerated with a larger screen. Nevertheless, the fact remains that larger images on the screen are obtainable only by sacrificing depth of field.

Consider now the case where the negative is 70 mm. in width and the release prints are 35 mm. in width, the printing being done by optical reduction. Since the quantity m_1 in equations (12) and (13) does not appear in equation (14), it follows that this reduction process neither increases nor decreases the depth of field when the other conditions are met—that is, when the same magnification m is used in the camera and a final image of the same size is projected on the screen. Equation (13) shows that when m_1 is one-half, as it is approximately under these conditions, the magnification in projection m_2 must be twice as great to keep the over-all magnification M the same. It is claimed, with some justice, that this reduction process reduces the graininess and that the magnification in projection m_2 can therefore be increased over what is possible when the print is made by contact. If the reduction in graininess is one-half, so that the magnification in projection can be doubled, the depth of field of pictures produced in this way is the same as with the two methods that have been discussed previously. It may be remarked in passing that it is no more difficult to design a projection lens to cover the 35 mm. film than one to cover the 70 mm. film if they are of the same relative aperture, but, with the same relative aperture, the illumination on the screen with the 35 mm. film will be approximately one-fourth as great. In addition, projection from the smaller film at a higher magnification imposes more severe requirements on the steadiness of the film in the gate.

Reference

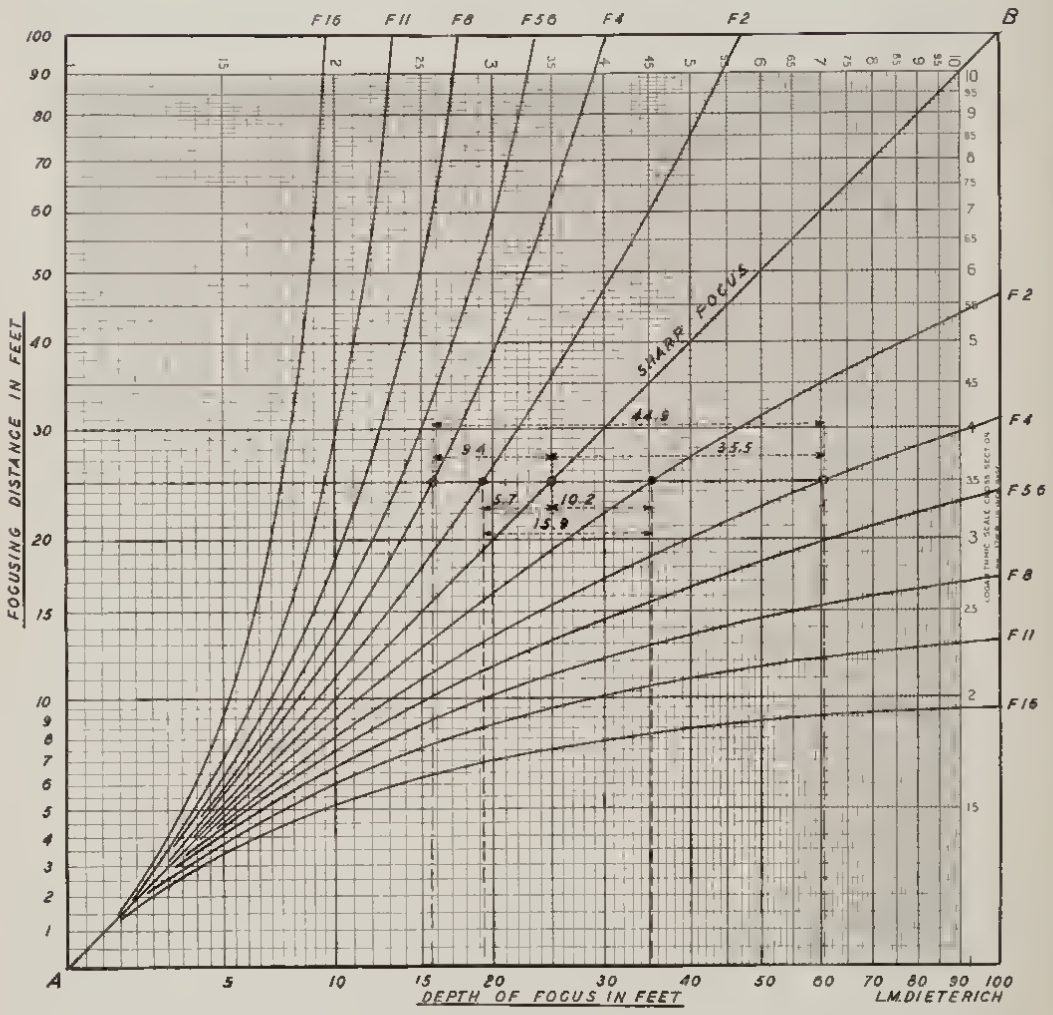
[1] See, for example, "The Distribution of Light in Optical Systems," A. C. Hardy, Journal of the Franklin Institute, Vol. 208, No. 6, December, 1929. It may be remarked in passing that the f/number is a measure of the illumination on the film only when the lens is focused on an object at infinity.

The above article is printed through the courtesy of the "Journal of the Society of Motion Picture Engineers."—Editor.

DEPTH OF FOCUS CHART

FOR DIFFERENT STOPS OF 50 MM LENS AND

FOR CIRCLES OF CONFUSION OF 0.05 MM



Screen Definition

by **DR. L. M. DIETERICH**

Consulting Engineer

Part 6

SINCE the last issue of this magazine, the author has been approached by several members of the profession with the request to publish a "handy" set of charts for the quick determination of 'Depth of Focus' for standard motion picture lenses at various stops

Mr Fred Westerberg showed in the **International Photographer**, November 1930 issue, a very comprehensive diagram covering this subject and the author has, with his permission, used the fundamentals shown therein for the design of the two charts, herewith offered to the cameramen in a form which he hopes will be of practical value

The examples embodied in these charts, when once studied, should make any further explanation superfluous

Returning now to the continuation of the filter study of the last article and for the present especially referring to the 'Moore" filters.

The majority of filters now on the market and in common use, suppress mainly to a more or less pronounced degree the blue end of the spectrum for the purpose of either increasing definition by eliminating blue" haze, cloud effects or to produce so called night shots or moonlight effects by decreasing light transmission, but at the same time maintaining characteristic contrasts

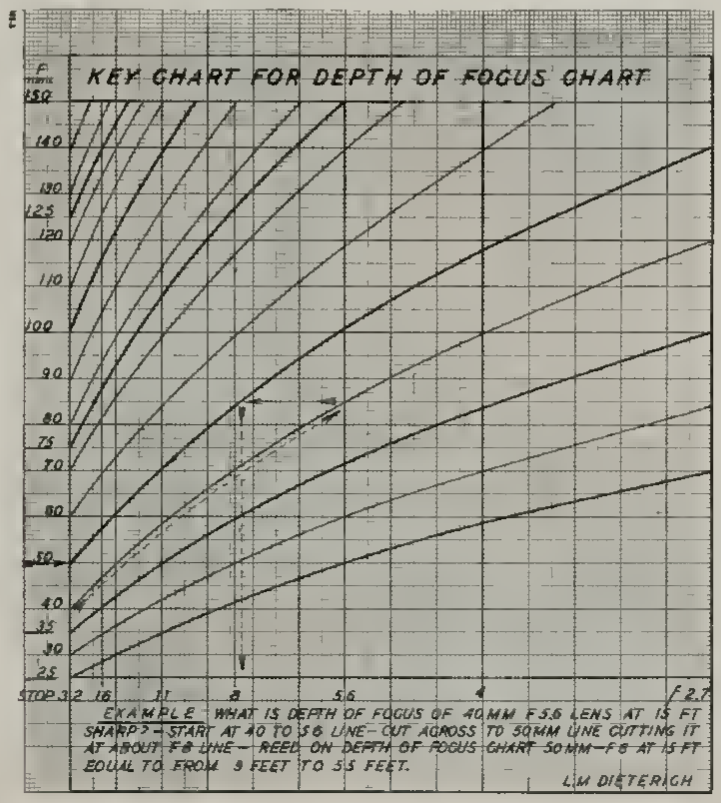
Such at present standard filter series, however, materially unbalance the actinic color reaction of standard film emulsions

As an example a 'night" scene photographed in daylight with a "night' filter and showing a North West Mounted Policeman in the characteristic red coat will, on the screen, depict him wearing a white coat As another example, standard panchromatic makeup shows under use of such filters serious color distortions and so forth

'Moore' filters obviate this destruction of actinic color balance by the proper blending of **red and green** filter elements

The blue contained in green controls red to such an extent that the proper balance of color values (other than the blue only) is maintained in all of the desired special effects to a far more correct degree than is possible with commonly used filters

(Continued on Page 37)



Ground Noise Reduction

R-C-A Photophone System

by **RALPH H. TOWNSEND**

EVER since Thomas Edison made his first sound recording on a piece of tinfoil, reproduced sounds have been what we might call "victims of circumstances" This is true not only of phonograph disc reproduction but that from film as well Always has the listener been compelled to hear reproduced sounds of speech and music accompanied by needle scratch or extraneous background noises of various sorts

In phonography this ever present background noise was and still is a source of untoward disturbance and annoyance It has been reduced somewhat by careful attention to the many processes involved in record production For instance, the wax on which the original recording is made has a homogeneity and uniformity undreamed of in the early days of the art Electrolytic copper anodes, carefully prepared solutions, and accurate timing and temperature control now produce from the master record a copper plating of almost microscopic smoothness The plastic compounds from which commercial records are pressed have been improved and refined to a remarkable degree

But in spite of all this we still have needle scratch or surface noise to contend with

Trouble Above 5,000 Cycles

With the advent of electrical recording the useful frequency range was greatly expanded Electrical reproduction was capable of taking off the record all that was on it including surface noise and then what did we do? We found by analysis and measurement that a great deal although not all of the disturbance from background noise lay in the frequency range above 5,000 cycles Electrical filters being easily constructed we then proceeded to cut off by means of a low-pass filter everything above about 4 500 cycles The surface noise disappeared to a considerable degree but so did most of the higher frequencies we had worked so long and diligently to include in our recordings However the ground noise was reduced, and that was what we set out to do, hence the experiment was a success

The use of film as a medium on which to record sounds involved all of the trouble heretofore encountered in disc recording and reproduction As a matter of fact there is a striking similarity between the processes Instead of granular wax we now have to contend with emulsion grain, instead of graphiting, plating and pressing we have developing and printing, instead of a plastic shellac compound we have another piece of positive film stock as a final record, instead of defective phonograph needles which do not fit the grooves we have light slits which get out of focus

You are no doubt all quite familiar with the reasons why ground noise interferes with reproduction and there is no necessity for a discussion of that particular point If there were no ground noise or extraneous sound disturbances speech and music would be clearer—we will all admit that The question is how can the ground noise be kept out or removed without interfering in any way with the wanted sounds or frequencies

Mr C R Hanna of the Westinghouse Company and Mr. C W Hewlett of the General Electric Company in the early part of 1929 did considerable thinking and research on this problem and at that time devised ways and means of accomplishing such an end. So far as we know Hanna's method is the basis of all those used commercially today.

Before we go further suppose we consider for just a few moments what ground noise is A general definition would probably run something like this "Ground noise is all sound evident in reproduction which was not present in the original sounds" You have all sat in theatres and heard this type of disturbance but probably few of you have taken the trouble to try and analyze this background noise It has been analyzed, however, and found to consist of disturbances from many different sources

Sources of Noise

For instance during a take on a stage or set it is almost a physical impossibility to have perfect quiet There is always a certain amount of set noise due to movement on the part of the many people who are on the set at the time, the cracking of arc lamp housings or incandescent lamp housings, noise due to the cameras and their driving motors, to say nothing of a certain amount of noise which is caused by traffic outside the studio or extraneous disturbances in adjoining studios

The next source of noise is located in the microphones and their associated amplifiers No matter how carefully an amplifier is constructed we always find a certain amount of noise due to circuit conditions and tube characteristics

If we add all of the components of noise mentioned above we find that up to the film we have a total noise level which may and often does assume considerable proportions. In some instances actual measurements indicate that this noise level is as high as 20 db Since all of these disturbances are included in the signal fed to the recording mechanism, whether it be an aeo light, light valve, or vibrator, all of them make their impression in the resulting sound track on the film Every film on which recording is made has a certain definite resolving power, that is, the ability to respond evenly to exposure The emulsion on film which is susceptible to the action of light and development is a very sensitive medium For this reason it is very desirable that it be treated with respect

It is not reasonable to suppose that we can subject a film to under exposure and over development or over exposure and under development and get uniformity throughout the resulting opaque portions In other words, unless the exposure and development is carried out with precision there is great possibility that the resulting granular structure will be a source of disturbance later on

During the developing, washing, and fixing of film there are plenty of opportunities, even in a well-ordered laboratory for the film to pick up small particles of dirt By small I do not mean particles of a size visible to the naked eye These particles may be, and usually are, microscopic in size Their ability to produce noise, however, is still considerable

The handling of film, that is of negative film and also of the positive stock, during the printing operation is another potential source of noise The developing and drying of the positive is still another source

You may well ask at this point how can the disturbance, due to a recorded sound track combine with dirt and make more disturbance If you will consider for a moment the manner in which a sound track on film is reproduced as sound the answer will be quite evident

(Continued on Page 36)

DuPont Special Panchromatic Negative

by **D. R. WHITE**

THE DATA here presented give direct comparisons between the characteristics of DuPont Special panchromatic negative and DuPont Regular panchromatic negative

From a purely scientific angle a complete analysis of such spectrograms as are shown in Fig 1 would give a very complete knowledge and comparison of the emulsion characteristics The knowledge would be so detailed as to be only of laboratory interest and would not be of value to film users in such form However, these spectrograms are reproduced here to show that the color sensitivity of the two films is essentially the same No regions of the spectrum included in the older product are omitted in the new and no large changes in relative sensitivity to different colors have been introduced

The scale of reproduction of the spectrograms is too small to allow much reliable comparison of general film speeds therefrom With this in view, H & D curves are presented in Fig 2 The curves were plotted from exposures made in a non-intermittent time scale sensitometer, using a tungsten lamp as light source The exposures for the curves marked 'white" were made with the light from the tungsten lamp

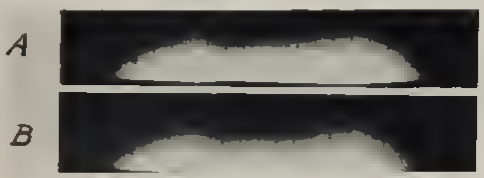


Fig 1 Spectrograms on DuPont panchromatic negatives
A Special
B Regular

falling directly on the film For the curves marked 'red" a Wratten A ' filter was placed in front of the light which was kept burning at the same position and brightness as for the "white" exposures In a similar manner the exposures for the "green" and ' blue ' curves were made by the use of B" and 'C ' filters respectively The sensitometric strips were developed together for eight minutes in borax developer with high agitation of the developer during development The comparison of these resulting curves, in pairs, confirms quantitatively the fact which was qualitatively evidenced by the spectrograms, that there is no appreciable difference in relative spectral sensitivity in the two products There is, however a notable increase in speed of the Special film over the Regular In actual practice it has been found possible to cut the set illumination from forty to sixty per cent in using this DuPont Special panchromatic negative

From these data it is evident that the filter factors for the Special and Regular panchromatic negative films are the same within very close limits The lens stop or lighting used with the Special film should, of course, be reduced to take account of the increased speed, but the filter factors themselves are essentially unchanged As all successful filter users know, the correct filter factor for a given set of conditions depends upon three things, the filter, the lighting, and the sensitivity of the film It is, of course, usual to specify a certain type or source of light and prepare a table showing the factor by which the stop should be increased to make up for the light absorbed by each of a series of filters This is thoroughly satisfactory only when the light source is constant in quality from time to time and place to place Daylight is not constant in either way, but must be used for so much of the work where a filter is needed that filter factors for it are of great interest Table 1 gives filter factors obtained in sunlight and shows, therefore, the factor by which aperture or time should be increased to compensate for filter absorption

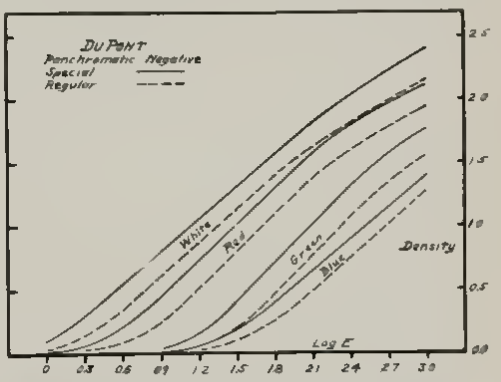


Fig 2 H and D curves on DuPont panchromatic negatives
White exposed to tungsten lamp
Red exposed to tungsten lamp through A filter
Green; exposed to tungsten lamp through B filter
Blue exposed to tungsten lamp through C filter

Where the light quality is not that of sunlight, these factors cannot be expected to hold accurately and a test shot should, of course, be made if the work is quite critical Experience has shown that for shadow shots, when there is an absence of sunlight but a predominance of light from the blue sky, the factors for blue absorbing filters should be increased somewhat over the values given, and for blue transmitting filters, if used, somewhat decreased

Table 1.

The body of the table gives filter factor for the Wratten filters, designated by letter, for sunlit scenes, for both DuPont Special and Regular panchromatic negatives

Filter	Filter Factor DuPont Special DuPont Regular
K1	2 2
K2	3 1
K3	4
G	5
F	10
A	7
B	16
C	12

The photo-micrographs, shown in Fig 3 show that the increase in speed has not been at the expense of grain size The importance of this consideration is obvious The two photo-micrographs were made under identical conditions and represent directly a true comparison of the grain sizes in the two products

The dark room handling for camera loading and processing both of these negative films is most safely done in total dark-

(Continued on Page 33)

Hal Hall SAYS

Thoughts in Passing

WONDER how so many cowboys manage to live _ thicker than fleas along Cahuenga Boulevard, and never seem to work Championship walkers ought to be discovered in picture studios No matter what studio you visit you get the idea that most employees must be hired to walk They are always going somewhere in a hurry Wonder if they ever arrive Take note yourself some day _ Harry Burns, Editor of Filmograph, is now giving the Cinematographers a bit of mention in his paper Thanks Harry, but don't call them 'Unsung Heroes" Call them darned fine artists who do an excellent job and are rarely mentioned in the public press . Other papers please copy . Wonder what has become of the picture stars who couldn't learn to talk . Also Wonder how some stars get along who in the silent days simply couldn't work unless an orchestra was playing favorite musical number Notice some of these are doing excellent work, but wonder why they got away with the bunk so long in the old days Still waiting to see who can tell Welford Beaton, Editor of Film Spectator, what a motion picture is Have often wondered why Welford doesn't tell us himself, as he is one of the most intelligent critics I have ever read Wonder how it feels to be hired by a big picture company to write stories then have big publicity break in papers . . only to be dropped three months later without having written a darned thing Irving Thalberg is one of the few really great production minds that has remained great throughout a long period of time _ Thalberg doesn't seem to suffer from brain fag no matter how long he works Remember how some said he would be just a flash-in-the-pan Perhaps one reason for his continued success is the fact that he devotes his time to intelligent thinking, and leaves public conversation to those who love to hear their own voices

This Month's Cover

ON THE COVER this month is the daughter of one of the members of the American Society of Cinematographers She is Joan Marsh, daughter of Charles Rosher, one of Hollywood s best known cameramen

While only eighteen years of age, Miss Marsh can look back many years upon her screen experience, for she made her first screen appearance when she was six months old She very early showed ability, and her father wisely guided her footsteps toward a career—taking her out of pictures to send her to school Then she returned to the screen and was featured at Universal From there she went to Metro-Goldwyn-Mayer, where she is now under contract Her father is one of the outstanding cameramen at the same studio Needless to say he is proud of his daughter, for she is the only cinematographer's daughter to gain a featured position on the screen to date, and she seems destined for stardom before she is through So, we may well say our cover this month is an A S C Cover

Advertising Films

BIG business eyes are being centered these days upon the screen as an advertising medium For years business has looked upon the screen and wished that the hundreds of thousands of theatre-goers could gaze upon delicious pieces of this cake or that butter, or this tractor or that brand of chewing gum, but until recently, the screen has fought shy of advertising, except when some particularly wise gentleman could have a closeup appear in a legitimate feature showing a particular brand of cigarettes, or something like that

But, now the country has become screen-advertising minded —or, rather, the advertisers and many production executives It remains to be seen whether or not the theatre audiences will feel the same way The success or failure of these films will depend upon the manner in which they are presented— on whether or not the producers use common, horse-sense. The public will not, it stands to reason, pay good money to go and see washing fluid glorified—unless the glorification is real amusement or entertainment

Richard L Strobridge, secretary of the Newell-Emmett Company, New York, seems to have touched the right note in his remarks made recently at a "talkie advertising" demonstration given at the Advertising Club of New York 'The screen has very definite limitations as an advertising medium, he said "It is dedicated, and rightly so, to the duty of entertaining those who pay their admission at the box office Therefore, it can offer nothing but entertainment if it is to keep faith with the public"

He then pointed out that there is a strict line of demarcation between straight advertising films and those sponsored by an advertiser—the advertising film having a certain play on the advertised product subtle or otherwise while the sponsored film only mentions the advertiser in the credit titles, and is 100 per cent entertainment with no attempt at showing the product of the sponsor

To our way of thinking the sponsored picture can draw no criticism as long as it is entertainment The straight advertising picture is the one that must be watched There is no reason why advantage cannot be taken of the screen as an advertising medium—but—it would be just too bad if the screen became like the radio of today

Mr. Nickolaus

OUT AT the Metro-Goldwyn-Mayer studios in Culver City is one of the finest laboratories to be found in the motion picture industry Very little is ever heard of it—perhaps because of the character of the man in charge That man is John M Nickolaus, a man who stands out as one of the most brilliant men in the motion picture laboratory field He is an unusual man in the picture business, for while others hammer at the gates of publicity he goes about his business quietly and efficiently. thinking only of how he can make his department a better one At this writing, a new laboratory is being constructed under his supervision. When it is completed it will be one of the finest in the industry, and will incorporate features that will be revolutionary But more of that angle later

Two charming studies by A S C members Gilbert Warrenton is responsible for the snow scene, John W. Boyle for the marine.

Bell & Howell to Erect New Hollywood Building

J H McNABB, President of the Bell & Howell Company of Chicago before his departure for the East after a prolonged stay in Hollywood, has announced the acquisition of a site, having a frontage of 240 feet on LaBrea Avenue, south of Melrose upon which will be erected a Class A building to house the West Coast branch of the Company

The building itself and adjacent walled-in parking space for the convenience of Bell & Howell patrons, will extend over a frontage of 140 feet, the balance of the site to be reserved for future expansions

The building will be two stories high and be topped by an attractive tower, lending grace to the structure and classing it as a new Hollywood landmark

The phenomenal technical advances of the Motion Picture Industry has prompted Mr McNabb to take the decision of establishing in Hollywood a fully equipped and competently manned Engineering Department, as a branch of the Chicago Research and Engineering Division of the Bell & Howell Company

The Hollywood Engineering branch will offer its services to Cinematographers, Laboratory experts and Producers, gather and develop new ideas to still further the accomplishments of the industry with the double advantage of being on the ground" where most technical developments originate and to have at its disposal the large resources of the Chicago long established research and engineering departments

A well appointed "shop" will take care of servicing all the Bell & Howell machinery in use in the Western territory, and will employ only the most skilled mechanics thoroughly versed with the various machines cameras, printers, splicers, perforaters, etc manufactured by the Company

In addition to professional Cinemachinery, the Bell & Howell Company producers high grade Amateur Motion Picture equipment and the Amateur Division in the Hollywood building will be entrusted with servicing it

Projection and editing rooms will be available to the public and constant displays of both professional and amateur equipment will acquaint those interested in the newest additions to the long list of Cinemachinery, which bears the Bell & Howell trademark

Of special interest to Cinematographers is the establishment of a fully equipped lens testing department and to laboratory experts the establishment of a fully equipped printing room

No expense will be spared to make this engineering and service laboratory one of the finest in the country through the help of both personnel and equipment

Mr McNabb was one of the pioneer Eastern manufacturers to establish a substantial permanent industry in Hollywood, and the present expansion is further proof of his confidence in the future of the Motion Picture Industry and a tribute to the members of the industry to their courage and their accomplishments

At the same time that the Hollywood Bell & Howell building is being erected, further enlargements are carried on at the Chicago Engineering Plant A story is being added to the two already existing, which will soon increase the activities of the Bell & Howell Chicago Manufacturing Plant and its New York and London branches

Ground for the Hollywood Bell & Howell building is being broken at the time we are going to press and its occupancy is scheduled for the early part of July

Electrolytic Condenser Data

ELECTROLYTIC condensers are very popular and are useful for certain purposes They provide a large electrical capacity with a minimum of space and cost In addition they automatically repair themselves in event of puncture due to excessive voltage

Here are the details of construction There is a metal container, which is employed as the negative terminal of the condenser In the center there is an aluminum plate, which is corrugated so as to enlarge greatly its surface area The aluminum plate is the positive terminal. The electrolyte may be a liquid solution of borax or other special material, or may be a paste In one instance the condenser is called "wet" and in the other "dry"

In theory, the liquid is supposed to react chemically with the aluminum, forming an extremely thin coating of gas all over the aluminum plate In this way, the aluminum becomes one terminal of the condenser, and the liquid in the cell the other real terminal The separating medium or di-electric is only the extremely thin layer of the gas between the liquid and the aluminum Because of the thinness of this gas layer, the electrical capacity is far greater than with condensers which are separated by paper sheets or other insulating substances It is important that the aluminum be connected to the plus terminal of the circuit

The electrolytic condenser is principally serviceable for low voltages but for higher voltages the great capacity available can be utilized by connecting several of these condensers in series Condensers that serve for up to 500 volts DC are considered "low voltage" Electrolytic condensers can be used on DC only

Exciter Lamp Discoloration

DISCOLORATION usually appears first at the top of the exciting lamp, which does not obstruct the intensity of the filament image When checking a lamp for discoloration, remove the lamp holder from the exciting lamp housing and look at the lamp against a white background This will give you positive proof of discoloration at the top and walls of the globe Make sure the glass is perfectly clear and clean in front of the filament

Again, warning should be issued against lamps with saggy filaments When the filament becomes slightly saggy, discard the lamp Inspect sound lamps daily, and be assured against loss in volume and injury to sound film reproduction

Slow-Motion Pictures and Glider Pilots

SLOW-MOTION pictures of trained eagles and falcons in flight are being used in Germany to instruct pilots in the handling of gliders

A training school for glider pilots at Rossitten used tamed falcons and eagles as models via the slow-motion film and the student pilots study every phase of the birds' flight and movement of their wings

Laboratory Department

Conducted by **EMERY HUSE, A. S. C.**

Desensitizers and Super Sensitive Films

IT IS often desirable to inspect film during development even though the time and temperature method can be used to produce negatives of a definite development contrast With panchromatic emulsions the use of desensitizers has been made with some degree of success However, desensitizers are not in general use in the motion picture field, but with the advent of the Super Sensitive type of panchromatic films questions relative to the more extensive use of desensitizing agents have often arisen With very fast emulsions certain limitations are imposed upon the amount of illumination permissible in the dark rooms while handling the film For Panchromatic Negative the Wratten Series No 3 safelight is very successful With the Super Sensitive type of films, however, this same light can be used but the brightness emitted by it must be appreciably diminished As a result of this it is only natural that the desensitizing question should arise

A photographic desensitizer is a substance which has the property of greatly diminishing the sensitivity of a photographic emulsion toward light action This agent must not affect the latent image already present on the film and furthermore it must not interfer with its subsequent development The most important reasons for using a desensitizer are 1—To permit the inspection of panchromatic film during development 2—To prevent aerial or oxidation fog

Desensitizing dyes can be used either in a preliminary bath or in the developer itself This latter condition, however, depends greatly upon the chemical constitution of the developer Concentrations of desensitizing dyes as used in preliminary baths are of the order of 1 to 5000 or 1 to 10,000 and the film is bathed in this preliminary bath for one or two minute periods just prior to development This operation of course must be carried on either in the dark or with the proper safelight When desensitizing dyes are used in the developer the concentration is usually of the order of 1 to 25,000, or less, and the film is left in the developer for about two minutes before exposing it to a brighter safelight having the same spectral distribution Unfortunately, however, most desensitizing dyes when incorporated in a single solution developer cause a precipitation of the dye, which results in trouble

With the rack and tank method of development desens tizers hold a relatively more important position but with the increasing use of developing machines for negatives visual inspection becomes less and less important that is visual inspection for quality and not for machine trouble It would seem, therefore, that there is relatively little application for the use of desensitizers in developing machines

In the consideration of desensitizers something must be known of their strength their effect upon the latent image, their effect upon development, fogging action, solubility in a developer, and various other functions Complete studies have been made of desensitizing dyes considering these facts Such dyes as phenosafranine, pinakryptol yellow pinakryptol green, aurantia, and several others have been thoroughly studied One of the most promising of those studied is pinakryptol green

In studying desensitizers, as mentioned earlier in this article it is necessary to give consideration to the developing solution, especially when it is planned to incorporate the desensitizing dye in the developer It is safe to say that approximately ninety five percent of the negatives developed for motion picture production are developed in the borax type of developer The use of a desensitizer in this type of a developer causes a precipitation and therefore should be ruled out However, if the use of desensitizers is seriously considered they should be used in a preliminary bath before the film reaches the developer In this case a preliminary bathing of one minute in a solution which contains 1 part in 10,000 of the dye chosen would decrease the sensitivity of the Super Sensitive type films sufficiently to permit the use of a Series 4 safelight at a distance of approximately a foot during development

This article was intended primarily to give a brief discussion of desensitizers and their effects on Super Sensitive types of emulsions That has been done, but in closing it should be stressed that it is much simpler and in the end much more satisfactory and less productive of trouble if work is done in total darkness or in a Series 3 safelight in which the amount of light has been cut appreciably It has been found that most commercial motion picture laboratories prior to the advent of Super Sensitive emulsions were using safelights at a very low level of illumination Many laboratories handled the Super Sensitive emulsions under these same conditions without fogging It would seem, therefore, that the use of desensitizers would only complicate and not assist in the operations in the laboratory As a final statement it is recommended that desensitizers not be used except as a last resort

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Patent Abstracts

U. S. 1,760,585. A Fried Assigned to William Fox Vaudeville Company A tripod head having means whereby a camera may be rotated both about a vertical and horizontal axis including means for steadying such a movement

U. S. 1,777,628. L DeForest Assigned to General Talking Pictures Corp A method of making continuous photographic sound and picture records of the same scene, which comprises employing a plurality of cameras at different focal distances from the scene, driving the cameras in synchronism continuously photographically recording the sounds originating in the scene photographically recording the scene by the cameras, and printing on a single positive film, the desired portions of the films of the different cameras including the sound record to obtain a continuous sound and picture record

U S. 1,777,037. L DeForest Assigned to DeForest Phonofilm Corp A binaural reproduction of sound comprising a film having different colored sound records thereon superimposed one on the other and longitudinally spaced apart one with respect to the other placed between sources of light and light-actuated cells sensitive to different wave lengths and means separately actuated by the currents generated in each of said cells for producing sound

U. S. 1,779,653. C N Ball Assigned to Warner Bros Pictures, Inc A motion picture camera having a sound insulating housing and provided with sound insulating shields for the camera and associated parts said shields being of such a character as to provide easy access to the camera reels and other parts

Eastman Announces Super-Sensitive Panchromatic Cut Film

ONE of the most important announcements in years to portrait, commercial and still photographers, is the announcement by the Eastman Kodak Company of a new Super-Sensitive Panchromatic cut film. Many photographic difficulties of the past should be swept away by this improvement of light-sensitive emulsions

"With incandescent lamps," states the announcement, "the new super-sensitive panchromatic film is from two to three times as fast as Portrait Panchromatic, a 'speed' sensation when announced two years ago The sensitivity of the super-sensitive panchromatic film, usually termed speed, is greatest when incandescent lights are used, because this form of illumination contains a higher percentage of red than daylight or the light from arc lamps

"To give one the best idea of what the extreme color-sensitivity of this new super-sensitive film means to the man who works with artificial light, we should compare it with Par-Speed portrait film because this is a standard material used by both portrait and commercial photographers

'With clear incandescent lamps the Super-Sensitive Panchromatic is from five to six times as fast as Par-Speed This means that if you have been accustomed to making exposures of from two to three seconds with Par-Speed film your exposures with the Super-Sensitive Panchromatic would be about one-half second If you have used enough light to photograph children in one-fifth of a second with Par-Speed, your exposure with Super-Sensitive Panchromatic film would be one-twenty-fifth of a second—too fast for a bulb exposure

"Such speed opens up unlimited possibilities in both commercial and portrait photography The commercial photographer will look upon this increase in speed, not as much as a means of making fast exposures, but rather for the advantage of making exposures with less light When the photographer goes on an outside job he can feel safe with half his usual amount of lighting equipment, and will secure twice as much benefit from the illumination he finds on location And for studio set-ups, which often require long exposures, exposure time will be cut more than half, which is a great advantage in studio work

"The same applies to home portraiture Lighting equipment has made the work of the home photographer rather difficult If he now has ample light, he can either be relieved of much of his burden, or shorten his exposures and be more certain of negatives which do not show movement This latter procedure is the logical one for photographing children

"Industrial photographers are often faced with the problem of obtaining sufficient artificial lighting for subjects such as long shots of factory interiors or close-ups of machines with operators Flashlights are banned in many plants, although the new photo-flash lamps have entirely eliminated smoke and the fire hazard Since the Super-Sensitive Panchromatic film is especially efficient under artificial light, industrial photography is obviously simplified

'First—photographers will no longer be required to clutter working areas with large numbers of heavy lamps and thereby avoid hampering general factory operations

"Second—the amount of electric 'load' is cut down Third—where the usual amount of artificial light is available, much shorter exposures are possible This is valuable in arresting the motion of people or moving objects If shorter exposures are not required, smaller lens stops can be employed to increase sharpness and 'depth of field'

"The value of the Super-Sensitive Panchromatic film is equally well applied to industrial photo-micrographic work, such as studies of metal structure The qualities of the new film will answer the requirements for combining speed, color sensitivity, and fine grain

'The advantage of reducing exposures to a minimum when working under artificial light is highly valuable in doing live model work No longer are models required to endure long, strained poses that often result in stiff and ungraceful postures, and incidentally a series of 'retakes' In the past it has not been uncommon for model 'shots' to require five, ten seconds—even more—quite a long time for any but highly trained models to remain motionless Short exposures usually result in more pleasing poses

"The new panchromatic emulsion is, in addition to all standard sizes for still photography, available in 35mm motion picture film Industrial photographers who do motion picture work will find that when using the super-sensitive panchromatic film under incandescent lamps, the usual amount of light can be reduced from one-third to one-half This factor is very important in modern time study of factory operations with the motion picture camera

"The sensitive emulsion of this new film is very closely related to one prepared for astronomical photography, as well as to the new Wratten Hypersensitive Panchromatic plates for the high-speed requirements of newspaper photography under artificial light Astronomers, it has been learned, used the new emulsion recently in making observations seeking to discover whether there is moisture in the atmosphere of Mars The necessary time for exposing the plates in the spectroscope was reduced from ten hours to four in the observations in question

"Eastman's new Super-Sensitive Panchromatic film presents the very great advantage of speed without the sacrifice of those qualities so essential to fine portraiture or commercial photography It has fine grain, excellent exposure latitude, and builds up in the developer without blocking

"There is one very important precaution in the use of this new film which is necessary to good results A film so sensitive to light of all colors can not be exposed to light of any color in a dark room without noticeable 'fogging' The film must be opened, loaded, and developed in total darkness After about five minutes of immersion in the developing solution, a certain amount of desensitizing takes place permitting the use of a Series III Safelight for the remaining period of processing It is recommended that the time and temperature method of development be used when working with this high-speed emulsion Once the time and temperature system is established as standard practice, it will be found to be the most satisfactory method of development'

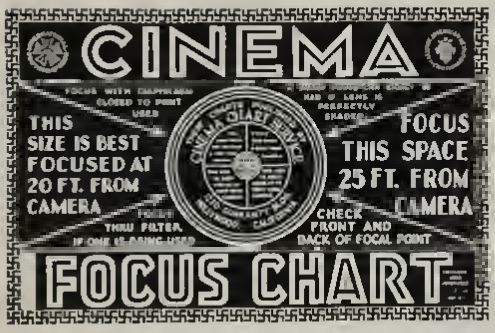
Milestone Develops Unique System

TO LEWIS MILESTONE, director of 'All Quiet on the Western Front" and 'The Front Page," goes credit for a very novel and valuable innovation in picture making

A scene sketch chart is now used by Milestone as a "first-aid" in the production of his pictures In other words, a complete scenic record of the entire play is sketched from the proper camera angles before the picture is filmed Each set of characters in the action of each sequence is pictured by the artist as if it were from the eye of the camera Beneath each sketch on each page of the chart is the dialogue and cues pertaining to the action Thus this scene sketch chart proves an invaluable guide not only for director Milestone, but for his entire technical staff as well The cameramen, film editors, assistant and technical directors have a daily reference index for their assistance in working out the details of each "shot" in the picture

For example; after each day's work is done the assistant director calls the cameraman and staff together, to refer to the sketch chart for the next day's work Thus when director Milestone arrives on the set each day he finds everything ready to go

Another Device From Jackson Rose, A. S. C.



WE OFTEN wonder when Jackson Rose sleeps Jack is one of Hollywood's best known cameramen But he is equally well known for his creation of new gadgets and devices to aid in the cinematographic field Some time ago he brought out a focus chart that created much interest Now he has improved upon that chart and has produced a gadget that should prove a very valuable adjunct to any cameraman's equipment It is a combination focus chart and scene slate On one side is the chart on the other the slate The entire gadget is of a heavy quality fabrakoid The entire chart and slate folds up and when ready for packing or putting in the pocket is 12 inches x 4¾ inches in size On the outside of the gadget is a place for the camera report for the laboratory This device should be very valuable on location trips

Amateur Movie Making

by HAL HALL

WHEN APRIL COMES—to most people it means that Spring is here But, to the Amateur movie maker, it means that another delightful season for picture making is at hand Already the home movie maker is dreaming of the coming vacation and the things he or she will do with the movie camera

Fine—but why not pause for a moment and check up on what you did wrong last Spring and Summer Not only check up, but sit down and make out a list of the faults of the past And when this list is made out, just paste it in your camera case, or anywhere else you choose, and profit by the mistakes of the past None of us are without faults We all have made mistakes, probably will do so again, but we should not repeat the same errors—that is, if we do a little checking on ourselves And Springtime is the best season to make this check, for most of us (except those of us who are fortunate enough to live in Southern California) will do most of our picture making in the Spring and Summer

First—why not check the camera and camera equipment If you do not trust your own judgment and mechanical ability, take your camera to the camera hospital and have it inspected, thoroughly If any repairs are needed, have them made, by all means Have the projector looked over, for after a winter of rather constant use, it may need inspecting The least one can do is keep his equipment spotlessly clean and well oiled As a rule you can judge the seriousness, and the ability, of an amateur by the condition of his camera And, surely, a camera deserves attention The equipment of a professional cinematographer is immaculateness itself If he did not give his camera care, his work would suffer True, the amateur's livelihood does not depend upon his camera, but his personal satisfaction and artistic reputation do depend upon the way he keeps it

In most amateur outfits the matter of maintenance is simplified because of the fact that the more delicate parts are tucked away out of sight and danger But the inside of the camera box should be kept spotless and free from shreds of celluloid and other particles that do gather Those parts that require oil should be oiled regularly—but be cautious,

Lenses

And then the lenses Many lenses are horribly abused I have seen some amateurs take a fairly soiled handkerchief out of the trousers pocket and rub vigorously over an expensive lens surface God help the lenses of such amateurs! Be careful how you clean that lens Do not use your handkerchief, or the sleeve of your jacket Use only the very softest cloth, or, still better, a special lens tissue for the purpose Silk should not be used, and this writer would never use the so-called lens fluids or liquids that are supposed to clean When not in use your lenses should be kept covered and shielded from the direct rays of the sun which seriously injure the polish It is best to keep your lenses wrapped in a piece of soft cloth when not in use If possible, have a special lens box or case A good rule is to have a special box to hold both your lenses and your filters In this way, you will always find them ready for use and in excellent condition

Speaking of filters, be even more careful with them than you are with your lenses Keep them absolutely shielded from the sun's rays, and remember that, at best, filters have only a definite lifetime The filters used by amateurs are fairly staple, but they deteriorate to considerable extent, and should be replaced Right now is a good time to look yours over, and make the necessary replacements before you start your Spring and Summer cinematographic activity Remember, that a replaced filter today may serve you a lot of grief when you are back in the wilds on that fishing trip before long —back where you can't even find a human habitation, much less new cinema equipment If you use them much, it would be a wise plan to replace them at least a couple of times a year So, if you have not done so since last Summer, look them over now and be sure of your filter equipment

While some of the professional cinematographers maintain an assortment of several dozen filters, the amateur, of course, need use but two or three The most useful pair probably are the K-2 and the Aero No. 1 With them most conditions ordinarily encountered can well be taken care of For most scenes the Aero No. 1, very practical for general use, can be used, but when shooting through any considerable haze, or on subjects where more marked correction is needed, the K-2 is very useful

The Tripod

And, how about that tripod? Is it in first class shape, or does it need some repairs You know, that a wabbly tripod may spoil the finest shot of the coming season Perhaps you do not use a tripod If you do not, let me advise you here and now to get one The novice may think that the tripod is merely a useless bother, but to the advanced amateur it means security—it is a necessity, not an accessory No matter how good your camera, you cannot expect to get a steady picture with an unsteady support Common sense tells you that. No human hand can hope to rival in steadiness an inexpensive tripod Long, long ago the still cameraman learned that the tripod is steadier than the hand Most of them would as soon leave filter or film behind as to leave the tripod It is obvious that the movie maker should use a tripod, also if he wishes to get the best results There are many tripods available to suit the individual purse—get one if you have not already done so, and see the improvement in your cine work

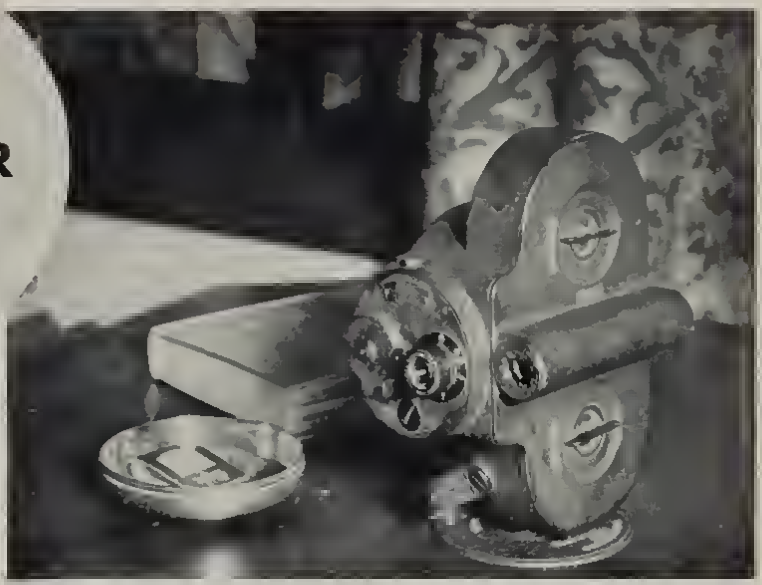
Reflectors

Another mighty useful device for advanced amateurs is the reflector Reflectors are as vital to excellent outdoor cinematography as a rudder is to a ship They are the means by which the cinematographer controls the sunlight which paints the picture as he wishes The professional cinematographer would not go on location without reflectors—they are invaluable Likewise, they can be of untold value to the amateur who is ambitious and wishes to secure the very finest of results

The amateur who is fairly handy with tools can make his own reflectors at a very little cost or effort They are merely large sheets of compo-board covered with aluminum leaf A perfectly smooth surface makes the hard reflector, or the type that reflects the maximum of light The soft or diffuse reflector is about the same, only with a matte surface Either of these will do well with any film, but studios sometimes

(Continued on Page 35)

NO FILMO HAS EVER WORN OUT



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—with Filmo

CARTER HARRISON, JR., *owns this veteran Filmo. He has put it to every conceivable test since it was acquired in 1925. In Turkey, along the Mediterranean, and throughout Western Europe, it has served its owner. His father, Carter Harrison, Sr., former Mayor of Chicago, has used it in his travels in China, Africa, and India. This Filmo has an unblemished record of dependable performance . . . a record it will successfully defend for years to come.*

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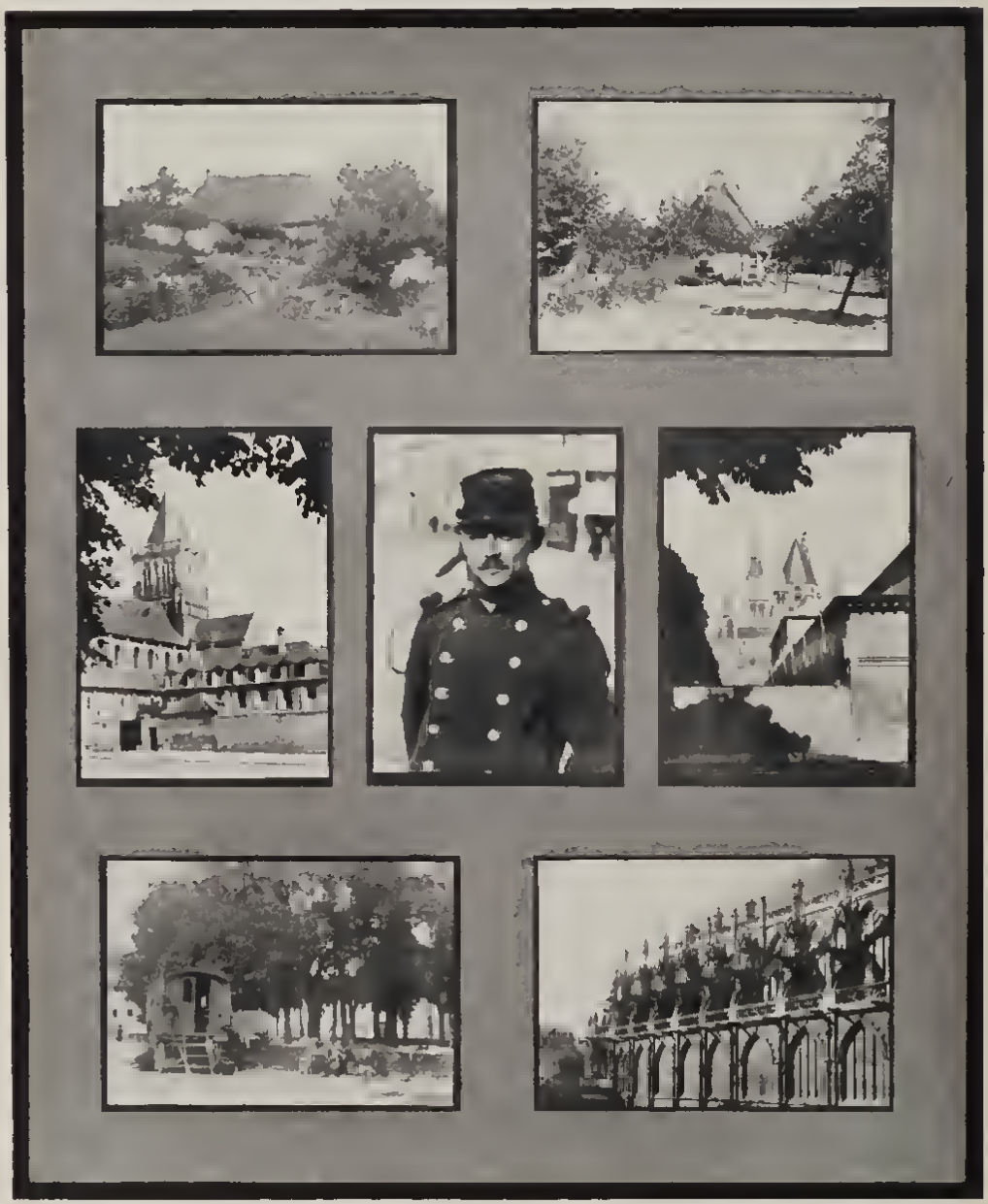


Upper left a typical Normandy cottage **Upper right,** Normandy orchard **Left center,** Abbaye aux Hommes **Center,** Paul Gassion **Right center,** Abbaye aux Dames **Lower left,** Gypsies make a stop **Right lower,** Church of St Pierre

Babbling About Brittany

by **LAWRENCE GRANT**

Mr Grant, one of Hollywood's best known actors, is also one of its best known amateur cinematographers and photographers He never goes afield without his "still" and 16 mm movie cameras This is the first of a series of articles he has prepared for this magazine, dealing with out-of-the-way places he has visited and photographed

—The Editor

I REMEMBER once being shown over a stately cathedral by a serious minded guide, and we, being young, were making flippant remarks about some ribald carving when our guide reproved us saying 'Let us leave the follies and frivolities of the world, and note the beauties of the architecture "

So would I say to those about to visit Brittany "Let us leave behind the sophistication of our usual lives, let us go with the spirit to enjoy and not to cavel, for our pleasure in travel is governed by our own receptivity, we get what we give, and I would rather travel with a Ford and smile than a Rolls Royce and a grouch, for with just a little money and much courtesy together with a desire to be pleased, you will be given in return all the politeness, all the help, all the hospitality you can desire "

Don't do as many travellers, of all nations, do and give the impression that you are a person of a different and superior planet looking down upon the antics of the natives as something to be tolerated don't regard every custom as 'barbaric' because it is not so done 'way back home "

Don't be like the Englishman, who, when asked if he liked Hollywood, said "Yes, but it is so far away " And the enquirer asked "Far away,—from where? ' and instantly the reply came From England, of course, where else could I mean '

If you will forget to expect hot water in your faucets (if any) or ice water in your glass, forget central heat, elevators and hurry, I can promise you such kindly people, such foods, at such attractive prices, as you have never had elsewhere in the world, peasants who will delight you, fisherfolk who will charm you, and plumbing (again, if any) that will astound and shock you, plumbing that could not be called plumbing, because plumbing means water, and water, many times there is not, only a sort of broom-like plunger,—but why go into that?—for at times it is simple, Oh! very simple,—simpler even than the peasant folk and all this you will find in that far Northwestern corner of France—Armorica—for that is the old, old name for it, not America—though the first American troops, and many after them, did land there—but Armorica—now called La Bretagne

Only I must stop off on the way at a Norman city, just on the borders of Brittany, called "Caen," famous for William the Conqueror Charlotte Corday, Metal work lace, Cathedrals, ' tripe a la Caen,"—and ' Calvados " Of all these, give me Calvados Very old, very "forte, very heady, very comforting Normandy after dinner cordial, that delicious brandy made from Normandy apples, which is so potent that it was absolutely forbidden to soldiers in the city in war time so naturally when one of them dined with me at the local hotel he had to have his in a demi tasse, just like being at home

I met this soldier, Paul Gassion, while I was exploring the Cathedral of St Pierre, and he very kindly drew my attention to some small carvings in the arch which would have otherwise escaped me, and which would never be approved by Comstock, but had been slipped into other ornate work by some facetious architect or sculptor And by the by, to those in search of the curious I recommend that they closely examine the clapper of the great bell on the turret top of that lovely mansion in the city called Hotel de Than " It consists of portions of the human anatomy never meant for striking belles

Don't miss it. Those who have seen it will understand my mis-spelling the word belles!

This same soldier had been a naturalized American earning $150 a week as interior decorator in San Francisco, but had left immediately in August, 1914, to accept a penny a day and his uniform from France

Caen has been called the 'City of Spires" and when one asks 'why so many churches?" I reply, in French, "Cherchez la femme," for the best were built on account of a woman Let me see, I can remember St Pierre, St Etienne le Vieux, Notre dame de Gloriette, the Abbaye aux hommes, and the Abbaye aux Dames, the last two built by William the Conqueror, and Mathilda his wife, in penance for marrying within forbidden degree of relationship

Then another, I forgot which, was built by William as a personal penance Having suspected Matilda of some wifely digression he caused her to be tied to a horse's tail and whipped through the streets of Caen (for he was a great Conqueror, first he conquered Mathilda, then he conquered the English) Later when he found he had been a little hasty, he built another church, which, while very good for art, was not so much good for Mathilda

During this processional whipping she only complained at one spot, where she said ' I am cold"—for in order to make the whipping effective she had been clad only in a chemise, or rather in those old times, a shift," so that she could be hurt physically as well as morally This is also commemorated by the street where it occurred, being called to this day the "Rue Froide " Better be Lady Godiva and ride naked and be peeped at than at the tail of a horse and be whipped But either way the lords gave their ladies short shrift in those days

You begin with the primitive even here, for I saw a street water-sprinkled in a very ingenious, even if somewhat ineffective, way No sprinkling cart seemed available, so the city worker let water flow from a street faucet and run down the gutter Then he, with a very wide spade, caught the water and threw it off the spade over the street This is quaint, but let us pause to realize that today France is short of labor No unemployment mostly because they have not allowed vast machinery to supplant man power and man-made things

It makes one think

Their sense of humor is quaint, too I dined in a small hotel restaurant, and round the room were eight enormous distorted mirrors They made you long and thin, or short and fat, and crooked and twisted, and a monstrosity in every way but each one different And then, as you left one good glass but of a color that made you pale green!

There were rows of little pigeon holes in the dining room, like letter boxes at a hotel desk, and I wondered what for I found they were to keep the rolled-up napkins of any guest who stayed for more than one meal!

And I thought of the man who, in a small Canadian hotel, asked for sheets on his bed, finding he had only blankets, and was told "If you want sheets, you ll have to wait till the 10 40 train goes out, because we are using the only pair we have for table cloths just now!

Now we will get on to Brittany

Just inside the line from Normandy is Brittany s, even France's, greatest Gothic Treasure—one of the world's architectural marvels—Mont St Michel Very few people know

that due north of the spot off the coast of Cornwall, England, is another St Michael's Mount, on a spot just like this in France about the same distance off shore, and with a cathedral building so similar that a picture of one looked at without close examination may easily pass as a photograph of the other

A little placed called Pontorson is the getting off place That is, where the nearest railyway is and then by tram, bus or car The last time I was there no tram was running and I, with one other voyager an architect and lover of Mont St Michel, M le Brun from Paris were the only ones off the train

The guide book says that at the station at Pontorson — "L'ete, des voitures publiques (prix variable) font parallelement avec le tram, le service du Mont" In this, if nowhere else, the guide book said a mouthful For outside was an old car, and an older 'wagonette" with a still older white horse Both besought me How much? Six francs Too much M le Brun arrived on the scene by this time How much for two and baggage? Both shouted "ten francs" The white horse parried with "nine francs" The car came back with "eight, fifty ' From then it was a battle of bidding in Dutch auction style, until rock bottom arrived at "five francs" for the two One franc less than the first bid for me alone, but they both stood firmly on this sum, so it became a matter of choice Would the car start "toute suite"? "Mais certainement, Monsieur, immediatement" So we chose the car, and we started chauffeur, le Brun, baggage and me, including cameras Oh, yes, and a Gend'arme We made about two hundred yards, and then bang! A tire blown out Evidently not unexpected, for he drove into a nearby farmyard, got a new tires out of some cache he had there and began to adjust it

During this replacing he cursed long and loudly, by 'bell, book and candle' every saint in the calendar—and St Michel in particular

Le Brun, the Gendarme, and I went off to a buvette during this and drank cider, and when we returned we found that he was much chagrined to find that it was impossible to pack a large, broken and very muddy bicycle with us as excess baggage

However, we stopped once more at the Mairie, and though we had failed with the bicycle, we here succeeded in taking on two cans of petrol, two circular loaves of bread—with a diameter of 3 feet each by actual measurement—and one French officer

The officer had to drive, the chauffeur sat astride the bonnet, and off we set on our five or six mile journey to the gateway

Why is there so much romance in the word "mountain"? Mount Ararat—Mont Martre—Mont St Michel—Monte Carlo —and none of these places will disappoint you—and after Monte Carlo—then, perhaps the Mont de Piete, by which romantic name the pawn shops of France are for some inexplicable reason, always called

Along the causeway to the entrance, le Brun all the time grouching because they had made the causeway permanent, and therefore the Mont a promontory, instead of an isle reached only over the sands at high tide Much controversy had raged about this between artists and materialists, and all over the place there were still 'affiches" remaining on the walls at many spots, put there by a French Artists Association 'Il faut que Mont St Michel reste une ile!' No use, the materialists built the Causeway

Mont St Michel, famous for the great Gothic building, for the marvelous portion of it, called La Merveille —for the swiftest tide, going in and coming back with the speed of a galloping horse, and very dangerous for strangers who may be caught and drowned, for dangerous quicksands, also, for the salt marshes on which graze the sheep later to become that delicious pres salees on the menu of your high-class restaurant in Paris, and for the giant omelettes of Mere Poulard, alas, no more of this world, though just inside the gates where the old Restaurant Poulard stood are several places, all claiming to be the old original Poulard"

On this visit of mine, though it was summer and season's height, when accommodation should be at a premium, not a soul there, not a single soul, but just le Brun and me

The trains arrived punctually at Pontorson The women left in charge of the hotels knew how soon to expect the cars coming along the causeway, and there they would come out along the battlements, with elbows on the walls and field glasses pressed to their eyes they would scan the distant road for these cars It was pathetic to see them, they looked like so many disconsolate 'Sister Annes" waiting for someone who never came

The main hotels are all in a row on the top of the battlement wall, and facing the mainland When we arrived the excitement was prodigious, and the reception royal The hotel proprietor, at whose house we decided to stay, was regarded as a person who had drawn a prize in a lottery, and to the credit of these wonderful people, the women of France, we were cooked for and served as marvelously and as perfectly as if we had been visitors during the most crowded and cheerful season

No young men, only old men and women carrying on— "pendant la Guerre"

As for the Cathedral with all its ramifications it is beyond description How any people, without modern mechanical contrivances, transported across the dangerous sands from the mainland such enormous blocks of stone, and having got them across how they managed to get them into their respective places in the 'pyramid of glorious antiquity' and how they carved this great mass into the infinite detail of exquisite art, is a mystery

It is beauty beyond comparison To stand at one end of the refectoire and observe the perfect invisible and indirect lighting the whole immense room being evenly and brightly lighted, puzzles one until you discover that deep set between each of the pillars that run down the sides is a long gothic window The picture on the other side shows this lighting very clearly The cloisters are of the most delicate beauty while outside, the walls and staircases are massive beyond words It is truly "La Merveille"

When I left, and of course I had to leave and the chauffeur knew that, he charged me ten francs for going back alone— so he evened up matters with me there

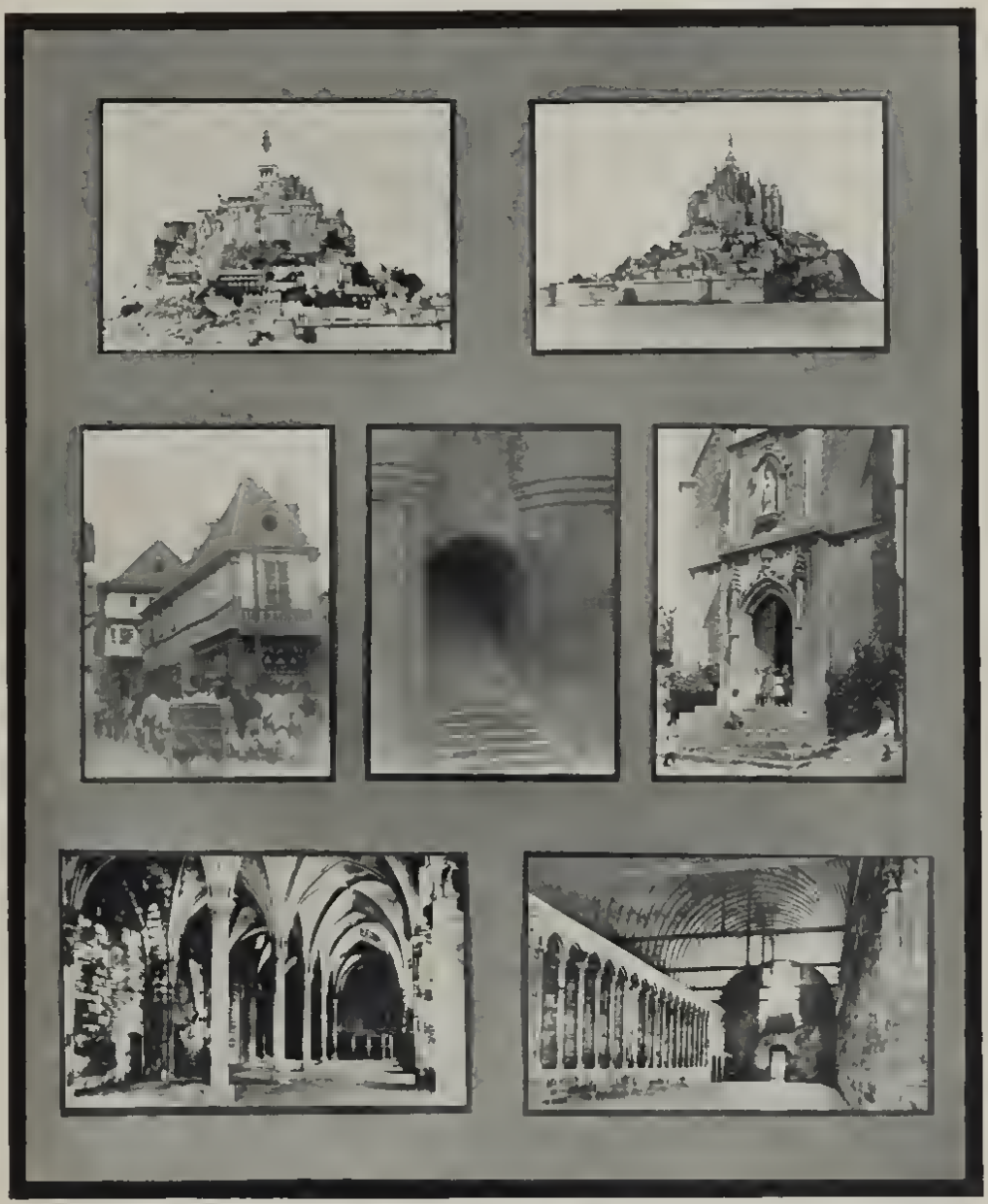
In getting him, I encountered one of those strange viewpoints you so often find in France There was no telephone, so when I wanted him I was to telegraph—not to his house, as he was away all day, but to the station where he would be in and out all the time—so I sent the telegram there

"But,' said the operator, "you are charged fifty cents extra for delivery as it is outside the free city delivery"

I said 'That cannot be The railway station where I am sending it to this man is in the center of Pontorson"

"That may me," said she, 'but though it is sent there, and will be delivered there, the man resides outside the limits and therefore it must be without doubt that you pay fifty cents additional '

' C est la France"



Upper left [illegible] **Upper right** Mont [illegible] from the sea **Center left.** Soldiers going on duty **Center.** Heavy [illegible] **Center right.** Chatre[illegible] church **Lower left** Salle des Hotes **Right lower.** Refectory

Cogs in the Wheel

by **EARL MILLER**

Chief Electrician Paramount Publix Corporation

WITH the introduction of sound pictures, the cooperation given the sound department by other production units of the motion picture industry is in a great measure responsible for the progression that the "talkies" have made

In an endeavor to bring sound production to a higher point of achievement, new features constantly are being introduced, many of which already have been adopted—but only after they have passed through experimental stages and have been subjected to tests that have proven costly to the industry

Endeavoring to minimize production costs while contributing efficiency to the production of sound pictures, departmental executives have given materials and equipment exacting tests, which have resulted in the junking of much equipment

Earl Miller

that was satisfactory prior to the advent of the microphone These antiquated products have, of course been replaced by modern equipment.

And now with the introduction of supersensitive film, the industry is confronted with similar problems to those solved when sound pictures first were undergoing the transitory stages of development In no other branch of motion picture production is the importance of cooperation more essential than in the electrical department

The lighting requirements of supersensitive film demand the resourcefulness of our most adept studio technicians The success of supersensitive film is, of course dependent upon proper lighting and its advantages over the old film have been intensified through the cooperation of the cameraman with the electrician It requires less "juice" than the old film—which means a substantial saving to the studio in production cost—an important reason why every attempt will be made to bring out its virtues

Two streets, one of them more than 500 feet long, recently were completed for production on the Paramount-Publix lot In order to properly illuminate these streets which represent two of New York's well known thorofares, several hundred lamps will be employed, the majority of which will be Laco Lites, which type we have found meets the most exacting requirements of sound pictures as well as supersensitive film.

We adopted Lacos as standard equipment only after we had subjected them to severe tests which resulted in our recent order for one hundred and twenty 18 inch and fifty 24 inch Laco Lites augmenting our supply of Laco products to more than 520 units

The electrical department in any studio today is called upon, on a minute's notice, to produce any number of lighting effects that come with modern treatment and modern picture production—and it is up to that department to meet those requirements with equipment that can fill the bill For that reason the industry is more or less dependent upon those concerns whose endeavor it is to cope with the problems offered in picture production today The fact that they keep abreast with the trend takes a great deal of worry, time and expense off our hands—as they maintain their own experimental department, and before their product is offered to the industry we are assured of its ability to meet our requirements

In the adoption of Laco products, Paramount-Publix Corporation is confident that Laco Lite equipment has passed transitory and experimental stages—thereby minimizing cost to the studio—the conscientious desire of every studio technician

●

New Boston Studio

A NEW organization has been formed in Boston, Mass., to produce commercial and educational pictures A studio has been opened at 45 Broadway, and plans are under way for a laboratory. F W Adams is president

●

Paper Film

A NEW type of film stock, made from paper, has been demonstrated recently in Paris The film is very thin and transparent, and is quite free from fire hazard. Ozaphone, who produces it, claims that it can run 6000 times, and is so thin that 8,000 feet of it can be put in one spool box and be marketed at 50 centimes per meter

●

Harry Perry Abroad

HARRY PERRY, A S C, has left for an extended trip through the Mediterranean He is photographing a series of scenic pictures in Multicolor for Brown and Nagle—Educational release He will be gone about six weeks Perry had to fly from Los Angeles to New York to catch the boat Improved his time enroute by photographing Grand Canyon from the air

●

New Apparatus Exhibit

ONE of the features of the Spring Meeting of the Society of Motion Picture Engineers, which will be held in Hollywood next month, will be an exhibit of new motion picture equipment developed during the past year The equipment will not be in the nature of a trade exhibit Rules regulating the exhibits state that no pamphlets or advertising literature will be permitted Each exhibitor will be permitted to display one small card giving the name of the manufacturing concern, and each equipment shall be labeled with a plain label free from the name of the manufacturer.

Excuse Us!

MUCH as Ye Editor hates to admit it, he committed a large-sized error in last month's issue He announced that the stork had brought a DAUGHTER to Mr and Mrs Edward O Blackburn. The genial Mr. Blackburn says the announcement was perfect except for the fact that it was a SON that the stork brought.

Dupont Negative

(Continued from Page 171)

ness Light that does not reach film does not fog it Under some operating conditions both on commercial and experimental scale total darkness is a considerable handicap Practical experience has shown that, where extreme caution is used, a dim green safelight can be used, which will permit some vision and still not fog the film in exposures of a few minutes dura-

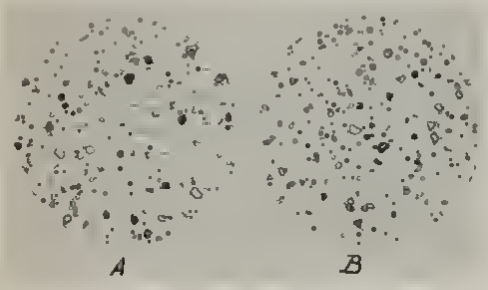


Fig. 3. Photo-micrographs of grains from DuPont panchromatic negatives.
A. Special
B Regular

tion No such light can be here successfully specified that will meet all working conditions It is suggested, however, that where such light seems essential, dim green safelights be used and tested in place Such a test can readily be made by exposing short lengths of the type of film to be handled in some simple holder such as a fold of black paper or cardboard which will expose part of the film to the light under test and protect part from that light This may well be in the form of a slide such that the protecting cover may be moved back at specified time intervals, allowing a series of exposures on one piece of film The threshold of fogging action can readily be determined in this manner with a minimum of time, film and effort Developing such pieces of film will quickly show whether an exposure of any chosen duration at the selected position will or will not produce fog on it Obviously no light can be judged safe when it fogs film in a time equal or less than the probable exposure of the film to it in processing A factor of safety must always be considered to allow for a possible and probable variation in handling time A second type of safety factor must be considered if light is used at more than one stage, since harmful additive exposures might occur to lights individually judged safe enough All of these considerations should lead one to handle and process the film in total darkness unless the value of the presence of light is great enough to warrant adequate planning, testing and continued watchfulness in use

Where it has seemed desirable to desensitize film to permit the use of an increased amount of light to watch development, the same procedure may still be used The increased original speed of the Special negative may, in limiting cases, require the use of slightly less light after desensitization than could be used with the slower Regular negative, but in all tests made, desensitization of both was great enough to permit very satisfactory working light for development after desensitization

With all of these facts in mind, the DuPont Special panchromatic negative is seen to require no change in technique of make up, taking and processing In using it, all that is needed is to cut the lighting and go ahead in just the same way as with the Regular panchromatic negative

German Returns to New York

William German

WILLIAM GERMAN, Vice-President and General Manager of J E Brulatour, Inc , has returned to New York after a brief stay in Hollywood Mr German came to Hollywood to supervise the introduction of the new Eastman Super Sensitive Panchromatic film On leaving he expressed much satisfaction over the way the film had been received, fifteen pictures being in production with the new film being used

Leigh Griffiths Heads R-K-O Mechanical Staff

LEIGH GRIFFITHS, formerly head of the Langley Field research laboratory, has been signed by Joseph I Schnitzer to head the mechanical engineering staff of R-K-O Griffiths will begin immediately on the designing of precision equipment for R-K-O's new Coast laboratory

New Color Company Formed; Studio In L. I. City

OPTICOLOR CORP has been formed to make and market a new three-color, additive process Merrill Waide is president of the organization, which is operating at its studio, 4377 Vernon Ave , Long Island City Backing the venture are T W Phillips of Butler, Pa and Chester Breining, New York broker The process involves a lens which may be attached to any standard projector

Opticolor is also interested in a sound process for 16 mm film

Eight-Reel Commercial Being Made for Goodyear

AN EIGHT-REEL talking picture for the Goodyear Tire & Rubber Co of Akron is nearing completion at the Detroit Sound Studios of Jam Handy Picture Service, according to John A Freese, studio manager and director This picture, "Every Third Wheel," is the first commercial of feature length to be recorded with the new Western Electric Noiseless Recording System The greater part of the action was shot in the complete tire shops built inside the studios, although there are numerous exterior scenes, including views of the giant Goodyear Zeppelin dock at Akron

It is understood that the completed picture will be shown at more than 150 points throughout the country to Goodyear dealers and their salesmen

Filmo Abroad

Sir William Letts, K. B. E., was the guest of honor at a great war dance held at Johanneshurg and, of course recorded the colorful ceremony with his Filmo. He is seen here talking with the dance leader just after the action had stopped

Theatre Test for 16 MM.

IN ORCHESTRA HALL, Chicago, recently a travel lecture by Burton Holmes was followed by an interesting demonstration of the Bell & Howell 16 mm talkie reproducer, the Filmophone.

In this demonstration, it is stated, a new model Filmo projector unit, equipped with one of the recently perfected 375 watt lamps threw perfectly clear pictures sixteen feet three inches wide on the screen, and the voice and musical accompaniment could be distinctly heard in the farthest corner of the big theatre which seats over 2500 people.

The size of the picture on the screen was determined by actual measurement, and the quality and volume of the sound accompaniment was tested in several parts of the hall according to those present.

The test of the talkie outfit was staged by the Industrial Film Division of Burton Holmes Lectures, Inc., after the audience which had attended the Holmes lecture had left the hall, although Mr. Holmes and several of his friends remained to see the results of the demonstration. Naturally, the acoustics of the hall would have been improved by the presence of an audience, but even so, it is stated, the slightest sound from the record could be heard right up to the last seat in the hall. "In the top gallery," says Burton Depue of the Burton Holmes organization, "I could distinguish every word coming from the loud speaker on the stage, but for the life of me I could not tell where the speaker was located, it was too far away to be seen from this point."

The Filmophone was placed in the regular projection booth of the hall, over 90 feet from the stage, and a cord approximately 150 feet long was extended from the booth to the loud speaker. A regular two-inch lens was employed in the projector.

The volume of the sound accompaniment is reported to have been so great that it was unnecessary to advance the volume control to capacity.

●

It is the intention of Czechoslovak exhibitors to create a special sound-film group with a view to protecting the interests of wired theatre owners and to obtain the most favorable conditions for the purchase of sound-film reproduction equipment. This is following along the line adopted sometime ago in Great Britain.

Listen Laura!

HARRY MEYERS is in the midst of a graphic explanation, to Laura LaPlante of the surprising features of the new Mole-Richardson Integral incandescent lamp. He tells her the Integral Inky is absolutely noiseless. In other words eliminates all cracking or popping noises when current is switched on. Miss LaPlante and Mr. Meyers are playing in "Meet the Wife," a Christie production, A. Leslie Pearce, director.

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New Color Device

ANOTHER new entrant into the color field is Rotocolor, an invention of Harold Muller of 160 West 45th Street, New York City. The new process, as reported, involves a shutter device attachable to any standard projector and which is quickly removable allowing switching between black and white and color. The process does not concern laboratory processing of film. The inventor claims that his system is very inexpensive in comparison with other color systems.

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Sound For Navy

SIX officers and fifty-six enlisted men of the United States Navy have been graduated in the first classes of the sound technician schools organized by RCA Photophone to instruct students in the operation of sound equipment soon to be installed on navy ships and at various stations.

●

New Laboratory Corp.

REPORT has it that Sol Lesser and Mike Rosenberg have parted company with Roy Davidge in the laboratory business. Davidge has incorporated under title of Davidge Film Laboratory, Ltd. Davidge plans to build a new structure on Santa Monica Boulevard. Work is slated to start within a month, according to report.

●

Paramount Adding Stage to New York Studios

PARAMOUNT officials have approved plans for a new stage to be built adjacent to the present New York studio. A heavy feature producing schedule, augmented by an ambitious shorts program, has made it necessary to provide more room.

This annex, the latest of several added in the past two years, will be connected with the main building by an underground passageway.

Driving Off!

THE FIRST whack of Bobby Jones as a motion picture star The world's greatest player of the ancient and royal game makes the drive that is his debut as a Warner Brothers' star in a series of golfing shorts Director George Marshall is the gentleman in the link-side seat A Mole-Richardson Mike Boom is taking the sound

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Amateur Movie Making

(Continued from Page 261

use gilt, or bronze-surface stock for panchromatic film For convenience and protection, put a light wooden frame around the reflector, and hinge a prop on the back which will support it while it is in use Three of these, two soft and one hard, are sufficient for the amateur, although four, two of each kind, is ideal combination Unless you have tried the use of reflectors you have no idea how much they will help It takes but a little practice to become proficient in lining up reflectors on a subject and the results are ample to justify the effort They eliminate or lighten unpleasant shadows and enable the cinematographer to paint with sunlight, and the only cost is that of construction, for the sunlight is as free as the air

Throw Light Five Miles

PROJECTION of light from a bulb only about five or six times larger than the ordinary tungsten lamp used in the home, so that a person five miles away is able to read a newspaper by its rays, was demonstrated recently

The demonstration was conducted by W A Pennow, airport and airway lighting engineer with the Westinghouse Electric & Manufacturing Company at Cleveland, Ohio

The light was projected from a searchlight throwing a narrow beam over Lake Erie The beam spread only slightly over its course, Pennow explaining that the spread was only twelve feet a mile Thrown on the clouds the searchlight produced a round spot that looked about as big as a washtub

"The searchlight is designed principally to aid aviation in determining the height of cloud banks," Pennow said

"The searchlight, containing a 420-watt lamp, produces 1 840,000 candlepower Four per cent is lost every 5000 feet on a clear night Light haze will absorb about 10 per cent a thousand feet In heavy haze, the light can be seen a mile

"Used in fighting fires, the searchlight can penetrate about every kind of smoke but the blackest pall"

●

Paramount's New Color Process

PARAMOUNT now has in preparation for next year a new three-color additive process which will cut color film costs to 4½ cents a foot, as compared with present price of 8½ cents This process involves the use of ordinary black and white prints, with the color added by means of a filter mounted in front of the projector

●

Filmo Topics

FILMO TOPICS, the Bell & Howell Company's monthly publication for users of 16 mm cameras, has an excellent table of contents for the April number This magazine may be obtained free by sending your request to that company at 1848 Larchmont Ave, Chicago, Ill The April contents follow

1 Taking Movies of Children

2 Filming the Flappers How a girls' summer camp director produced and used Filmo motion pictures

3 Mr Fuller and His Filmo Abroad A traveler tells of filming Europe

4 Filmo News Pictorial News photos of Filmo owners

5 Titling Your Films No 7 Making "climbing" or "continuous strip" titles

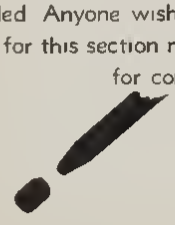
6 Gleaned from Here and There A collection of ideas on movie technique from Filmo owners

7 More About Projection Lamps

8 Questions and Answers

attention

The pictorial section of the next volume of the Cinematographic Annual is being compiled Anyone wishing to contribute prints for this section may send them in now for consideration



Ground Noise Reduction

(Continued from Page 16)

Influence on Reproduction

Most reproduction from film is accomplished by interposing the recorded film between a source of light and a photoelectric cell The intensity and amount of light may be considered as fixed, consequently any change in the opacity or width of the sound track as it passes through the light beam will cause a variation in the current through the photocell The output of any given cell varies directly with the amount of light change and is independent of the rate of light change This being true it makes no difference whatever to a photocell whether the light is cut off or varied by means of a sound track variation or by specks of dirt or foreign matter on the surface of the film

You will be shown later what a variable area sound track looks like and will note, too, why we are not particularly interested in varying density In normal variable area recording the sound track is always made up of equal portions of exposed and clear film

Any dirt or foreign matter getting on the exposed or dark side of the track would have no effect whatever but should it get on to the clear side its presence would be noticed as noise in the reproduction The reason for this is evident Dirt is opaque and the dark side of the track is nearly so, but dirt on the clear portion would cause a change in the amount of light falling on the photocell and produce noise

At the normal gain settings during reproduction, the ease with which wanted sounds can be heard depends on the ratio of the recorded sounds to the ground noise level In other words, if the modulation during recording was low i e of the order of say 10 or 15% and we accumulated a little noise from each of the sources mentioned a few minutes ago we would find it difficult to distinguish speech or music above the noise level

Hanna-Hewlett Method

The problem then was how to drop the level of ground noise to a point where it no longer interfered with recorded sounds Hanna and Hewlett did it by making opaque all that portion of the track not actually occupied by modulation An obvious and simple solution wasn't it?

Their method was simple and effective too They merely took a little of the output of the amplifier just before it was fed into the recording mechanism, amplified it, rectified it and used the resulting direct current to furnish what may be termed a secondary control over the vibrator A detailed description of this method and the circuits involved will follow shortly so it will not be necessary to dwell at length on that point now

What happens, however, is this The output from an audio frequency amplifier is in the form of alternating current The wave shape may or may not be symmetrical but in all cases the current values during any cycle start at zero, increase to a positive maximum, decrease through zero to a negative minimum and then increase again to zero If these values be plotted and a straight line be drawn through the zero points, this line may be considered as a base line above and below which the current values rise and fall In RCA Photophone recording this base line corresponds to the center line of our sound track when the vibrator is at rest in its normal position

Since the vibrator is designed to change its position with respect to this base line under the application of current changes, its position at any instant is determined by the value of the current at that same instant As the current rises to a positive maximum, the vibrator twists to an extreme position in one direction As the current falls through zero and decreases to a negative minimum, so the vibrator twists back through normal to an extreme position in the opposite direction

Suppose now that some direct current were introduced into this circuit It would have the effect of shifting the base line about which the vibrations took place to a new position and

we would have a new zero line Current changes and vibrator deflection with respect to the base line would remain the same as before but neither would be the same with respect to the new zero line

It will be noted that the value of the d c from the rectifier placed across the output of the amplifier is at all times proportional to the strength of the a c signal so we here have an automatic and positive control over this d c component or 'bias' if you will In other words it is necessary only to choose first the new base line for the vibrator setting and second the proper value of the d c to return the vibrator to its herctofore normal position in the center of the sound track Both are easily obtained and once set the ensuing action is simple, positive and automatic

Applications of this principle have been made during the past year or more at R-K-O Studios and Pathe Studios, where a number of productions have been made and released

●

The abeve paper is frem the Technical Digest service of the Academy of Motion Picture Arts and Sciences Another paper on the same subject, prepared by Hugh McDewell Jr, of Radio Studios will appear next month.—The EDITOR

●

Screen Definition

(Continued from Page 15

Regarding above cited examples the red coat will show its proper density in the same balance as if the scene would have been taken without filter and standard panchromatic makeups are **not** affected by 'Moore' filters

The series of 20 filters established under this system starts with No 0 which theoretically transmits no light and ends with No 20 which theoretically transmits with a stop of f 2 7 as much light (in proper color balance) as the same lens would pass at a stop of f 9 without a filter

The intervening filter numbers gradually, not only increase in light transmission value from 1 to 19 but are individually compounded of such relative color and transmission values for the red and green components that a correct density balance is maintained

In a previous issue the components for filters 1 to 6 have been given as selected from available Wratten filters They produce with an f 2 7 stop less density than the same lens would produce with an f 9 stop

For night effects this series is especially effective and the choice for either of them depends upon the existing illumination in order that necessary good contrasts are produced

Beyond No 6 these filters transmit sufficient light to reduce the contrasts below the value necessary for night effects

They have, however been proved very useful to produce soft tones to blue skies to absorb such blue light as characteristic of hazy, dust- or moisture-laden atmosphere and to produce the characteristics of effective cloud formations and structures within themselves even without the existence of the blue background

Unfortunately the filter series beyond No 6 cannot be compounded by Wratten filters but special red and green tone values must be used, which can in writing only be established by chemical formulae and minute description of relative proportions methods of preparation and proper mixing control which would be of no value to the cameraman and therefore be beyond the limitations of this study intended to contain as always useful disclosures of practical nature

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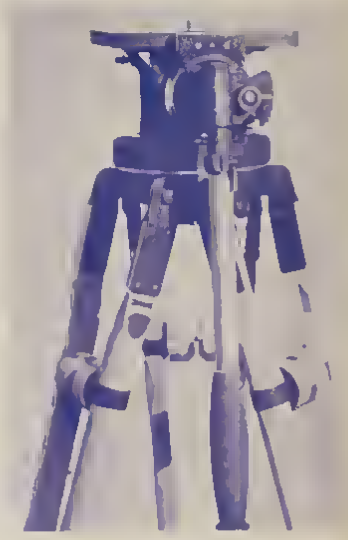

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